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# THE JOURNAL OF EDUCATIONAL PSYCHOLOGY

## STANDARDS OF MENTAL EFFICIENCY.

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We need not take any space here to discuss the desirability of norms or standards of mental efficiency. This desirability is recognized by everyone who has recently considered the matter. It is sufficient to say here that the gradation and classification of pupils, methods of teaching and, to a considerable extent, the nature of the curriculum should be based on an accurate knowledge of the mental capacity of the pupils.

The Binet-Simon tests have awakened interest in this country, as is manifest in the recent writings of Wallin (6), Huey (3), Terman (6), Whipple (8) and others. But the interest is chiefly in feeble-minded and backward children, the 4 per cent. at the lower end of the curve of distribution. It is the opinion of the writer that interest in mental tests must be extended to include not only the 4 per cent. at the upper end of the curve of distribution, *i. e.,* the supernormal, but *all* pupils, the normal as well as the subnormal and supernormal. Educational procedure will not be based upon scientific principles until the teachers have accurate knowledge of *all* the children in the schools. From the point of view of school finances alone it

will be quite worth while to make accurate tests of the mental capacity of the children. The financial loss to the State, due to poor classification and gradation, to say nothing of poor teaching, because of inaccurate knowledge of the mental and physical conditions and capacities of school children, is certainly very great. But little investigation is necessary to show that the classification of pupils is based on no sound principle.

. If it is worth while to spend money in testing the mentally deficient and providing for them the proper kind of education, it is certainly worth while to make accurate determinations of the normal and supernormal in order properly to classify *them* and to make proper provision for *their* training. For some time psychologists generally have been convinced of this, and therefore recognize the present urgent need of norms of efficiency for the various school ages. Before we can establish norms of efficiency we must agree upon the tests to be used. Now, the determination of the best tests and establishment of norms are both enormous tasks, for the experiments should be carried on in every section of the country and with thousands of children of all ages. This makes the task a national one and must ultimately be done under national supervision.

## What Tests Should We Use?

A good mental test must satisfy several conditions. (1) It must test some aspect of mind that is important in learning, either in getting ideas or in forming habits. Memory, association, attention and imagination doubtless have this importance, and we should, therefore, expect, *a priori,* that they should be tested. But we must not rely solely on theoretical considerations, but must determine what tests have the highest correlation with one another and with school progress. For an interesting discussion of this point the reader is re-

ferred to articles by Brown (1), Burt (2) and Hart and Spearman (5) in the *British Journal of Psychology.* (2) The test must be simple, easily given, readily understood by the pupils and easily graded. Simplicity is necessary for two reasons. If tests are too difficult and complex, it will take too much time and trouble to give them; teachers would not undertake them. Simplicity is also necessary for accurate grading of the results. During the past two years I have given various mental tests to several thousand school children, chiefly in three St. Louis schools and smaller schools in Missouri. The same tests have been given to students in my classes in the University of Missouri, several hundred in all. My results point, in general, to much the same conclusions that are warranted by the British studies mentioned above. The accompanying table (Table I), showing the intercorrelation of the various mental tests, is pretty good evidence of what the best tests are. The results shown in the table are from tests given with the greatest of care to adults. The tests given to school children, in general, confirm them.

One of the very best tests is certainly a test of logical memory. I have given this test more extensively than any of the others, using the *Marble Statue,* as prescribed by Whipple. There are three bits of evidence that indicate the worth of this test: (1) its high correlation with permanent retention, + .76; (2) its high correlation with other tests, an average of + .29, only two tests giving a higher average correlation with the other tests (see Table I); (3) its high correlation with school standing. Immediate memory, which is virtually learning capacity in the sphere of ideas, is an excellent criterion of permanent retention. In order to determine the relation between immediate memory and permanent retention I gave the immdiate memory test, using the *Marble Statue,* to two schools having about 300 pupils each. The correlation obtained from

TABLE I.—*Showing the Intercorrelation of Mental Tests.*

| | Simultaneous adding. | Complicated prose. | Attention. | Association. | Learning. | Rote memory. | Logical memory. | Fidelity report. | Imagination. | Sentence building. | Word building. | Description. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Simultaneous adding | .. | .21 | .00 | .43 | .76 | .25 | .21 | .44 | .24 | .00 | .71 | .21 |
| Complicated prose | .21 | .. | .21 | .31 | .71 | .41 | .48 | .08 | —.12 | .24 | .16 | —.03 |
| Attention | .00 | .21 | .. | .01 | .47 | .33 | .00 | .07 | —.19 | .35 | .22 | .37 |
| Association | .43 | .31 | .01 | .. | .44 | .00 | .39 | .17 | .23 | —.25 | .17 | .32 |
| Learning | .76 | .71 | .47 | .44 | .. | .44 | .55 | —.03 | —.10 | .17 | .44 | .02 |
| Rote memory | .25 | .41 | .33 | .00 | .44 | .. | .36 | .27 | —.13 | .29 | .27 | —.05 |
| Logical memory | .21 | .48 | .00 | .39 | .55 | .36 | .. | .07 | —.40 | .11 | .21 | —.31 |
| Fidelity of report | .44 | .08 | .07 | .17 | —.03 | .27 | .07 | .. | .37 | .12 | .21 | .17 |
| Imagination | .24 | —.12 | —.19 | .23 | —.10 | —.13 | —.40 | .37 | .. | —.42 | .06 | .21 |
| Sentence building | .00 | .24 | .35 | —.25 | .17 | .29 | .11 | .12 | —.42 | .. | .01 | .05 |
| Word building | .71 | .16 | .22 | .17 | .44 | .27 | .21 | .21 | .06 | .01 | .. | —.05 |
| Description | .21 | —.03 | .37 | .32 | .02 | —.05 | —.31 | .17 | .21 | —.05 | .05 | .. |

NOTE.—Correlations marked (—) are negative; those unmarked are positive.

the results of the two tests was .76, P. E. .02 in one case and .70, P. E. .03 in the other. The retention test was given five weeks after the first test. Permanent retention, other things equal, is a good criterion of the outcomes of teaching. Then, since immediate memory has a high correlation with permanent retention, it follows that immediate memory is a good criterion of the profit a child will get from school work. I have other than inferential ground for this conclusion. I determined directly the correlation between the standing of pupils in the immediate memory test and their standing in school work for the whole year. While there is great variability, the correlation is as high in some grades as + .69. Many tests that I have given my own classes convince me that whenever adequate means of determining class standing are used a high correlation is found between immediate memory and class standing. We cannot expect to find any single test that will give a *very* high correlation with class standing, because there are so many factors besides native capacity that help to determine class standing, ambition to succeed and good habits of study being of great importance. No matter what one's ability, he will not stand high unless he is ambitious and *works*.

Another valuable test, perhaps the best of all, is a test of learning capacity, Whipple's *substitution* test. I used both forms of the substitution test, and in the same way, allowing eight minutes for each. But this time is slightly too long for the upper grades. A better way would be to allow eight minutes for ages up to 10 and five minutes for ages 10 and over. The method of giving the test is to place the blanks and keys before the pupils, and, after explaining exactly what they are to do, have them turn over the papers and begin. If different times are allowed for different ages, then the average number of characters or digits correctly written in a minute could be

taken as the result of the test. Another valuable test is association (Whipple's *Manual,* pp. 313-327), the combined results of the uncontrolled association test and the three controlled association tests. I allowed three minutes for the uncontrolled, 90 seconds for the opposites, 45 seconds for the genus-species, and 30 seconds for the part-whole tests. It would probably be better here also to allow different lengths of time for the younger and older children. The number of associations per minute could be taken as the result, adding the four results to obtain the standing of a pupil in association. In attention I have used the simultaneous adding test and the "A" test. The former is doubtless far the better test, but it is not practicable to give it as a group test. The result given in Table II is from the "A" test, derived by the use of the formula for efficiency. For rote memory I used Whipple's list of words, revised so that it is suitable for all ages. The revised list is given in my *Educational Psychology,* p. 204. For imagination I have used three tests—the *inkblot* test, the *word-building* test, and the *sentence-building* test. The latter seems to have little value as a quantitative test; the inkblot test has little value as a quantitative test, perhaps considerable value as a qualitative test, and the word-building test has a fairly high correlation with the other tests. In Table II the inkblot test is given under *imagination* and the word-building test under *invention.* The method of giving the inkblot test was to allow one minute for the pupil to write the things suggested by each blot. The result in the table is the total for all the blots. Most of the correlations with the inkblot test are negative. The time allowed for the word-building test was five minutes. The result given is the average for the two sets of letters given by Whipple (*Manual,* p. 441).

On the basis of the above considerations, the most promising and available group tests were selected and given to school children.

TABLE II.—*Mental Efficiency.*

BOYS.

| Age | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | Gen. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | av. |
| Learning | 9 | 27.0 | 35 | 27.0 | 30 | 27.5 | 40 | 34.6 | 27 | 39.3 | 33 | 39.5 | 46 | 46.1 | 10 | 46.0 | 5 | 47.2 | 16 | 49.0 | 8 | 48.0 | 39.2 |
| Logical memory | 61 | 23.9 | 75 | 31.0 | 92 | 31.0 | 103 | 33.2 | 109 | 36.5 | 111 | 38.5 | 94 | 37.5 | 63 | 37.4 | 42 | 36.6 | 35 | 37.1 | 19 | 40.7 | 34.8 |
| Rote memory | 5 | 29.0 | 30 | 37.9 | 30 | 53.5 | 50 | 47.5 | 56 | 40.0 | 56 | 42.5 | 55 | 43.5 | 35 | 44.2 | 36 | 47.2 | 29 | 49.5 | 11 | 54.0 | 44.3 |
| Attention, "A" test | .. | ... | 20 | 23.3 | 10 | 24.4 | 28 | 31.6 | 13 | 39.0 | 21 | 39.0 | 19 | 51.1 | 11 | 55.0 | 10 | 64.1 | 9 | 62.0 | 4 | 70.5 | 46.0 |
| Association | 10 | 25.6 | 37 | 31.6 | 31 | 38.4 | 37 | 42.1 | 21 | 46.4 | 48 | 47.2 | 32 | 52.3 | 12 | 55.8 | 17 | 54.8 | 16 | 68.1 | 8 | 72.7 | 48.6 |
| Imagination ink-blots | 2 | 23.5 | 20 | 46.6 | 25 | 40.5 | 45 | 45.5 | 21 | 43.8 | 39 | 62.0 | 12 | 31.5 | 12 | 31.5 | 12 | 34.2 | 14 | 33.3 | 11 | 31.0 | 38.3 |
| Invention | .. | ... | 17 | 17.5 | 11 | 17.5 | 19 | 19.7 | 16 | 23.1 | 14 | 25.8 | 21 | 22.2 | 18 | 24.0 | 16 | 33.6 | 21 | 34.5 | 11 | 35.8 | 25.3 |
| Total mental efficiency | .. | 25.8 | .. | 30.7 | .. | 33.1 | .. | 36.0 | .. | 38.3 | .. | 42.1 | .. | 40.6 | .. | 42.0 | .. | 45.4 | .. | 47.6 | .. | 50.4 | 39.5 |

GIRLS.

| Age | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | Gen. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | No. | Av. | av. |
| Learning | 29 | 20.0 | 54 | 31.5 | 30 | 31.3 | 49 | 38.2 | 41 | 44.2 | 41 | 46.2 | 42 | 48.0 | 23 | 46.3 | 2 | 50.0 | 16 | 46.3 | 9 | 48.7 | 40.9 |
| Logical memory | 46 | 26.7 | 86 | 31.8 | 87 | 34.3 | 115 | 35.6 | 134 | 38.0 | 117 | 40.1 | 107 | 40.2 | 77 | 41.0 | 70 | 39.7 | 58 | 39.4 | 25 | 42.1 | 37.2 |
| Rote memory | 16 | 29.0 | 38 | 37.0 | 37 | 42.0 | 67 | 39.5 | 64 | 41.0 | 59 | 43.0 | 78 | 44.5 | 49 | 46.7 | 63 | 46.8 | 51 | 51.5 | 20 | 52.7 | 43.1 |
| Attention, "A" test | 18 | 16.0 | 24 | 28.0 | 21 | 30.0 | 26 | 38.0 | 20 | 45.2 | 16 | 51.3 | 23 | 55.7 | 13 | 68.0 | 13 | 70.2 | 16 | 62.3 | 8 | 64.9 | 51.3 |
| Association | 28 | 27.6 | 50 | 35.7 | 35 | 38.7 | 46 | 48.5 | 39 | 52.6 | 38 | 49.6 | 38 | 58.3 | 18 | 63.3 | 23 | 65.6 | 32 | 70.9 | 16 | 74.3 | 53.2 |
| Imagination ink-blots | 2 | 23.5 | 20 | 46.6 | 25 | 40.5 | 45 | 43.5 | 21 | 43.8 | 39 | 62.0 | 12 | 31.5 | 12 | 31.5 | 12 | 34.2 | 14 | 33.3 | 11 | 31.0 | 38.3 |
| Invention | .. | ... | 17 | 17.5 | 11 | 17.5 | 19 | 19.7 | 16 | 23.1 | 14 | 25.8 | 21 | 22.2 | 18 | 24.0 | 16 | 33.6 | 21 | 34.5 | 11 | 35.8 | 25.3 |
| Total mental efficiency | .. | 28.2 | .. | 32.6 | .. | 33.5 | .. | 37.6 | .. | 41.1 | .. | 45.4 | .. | 42.9 | .. | 45.8 | .. | 48.6 | .. | 48.3 | .. | 49.9 | 41.3 |

NOTE.—No. = number tested; av. = average mark of children of that age.

Results for boys and girls combined in imagination and invention.

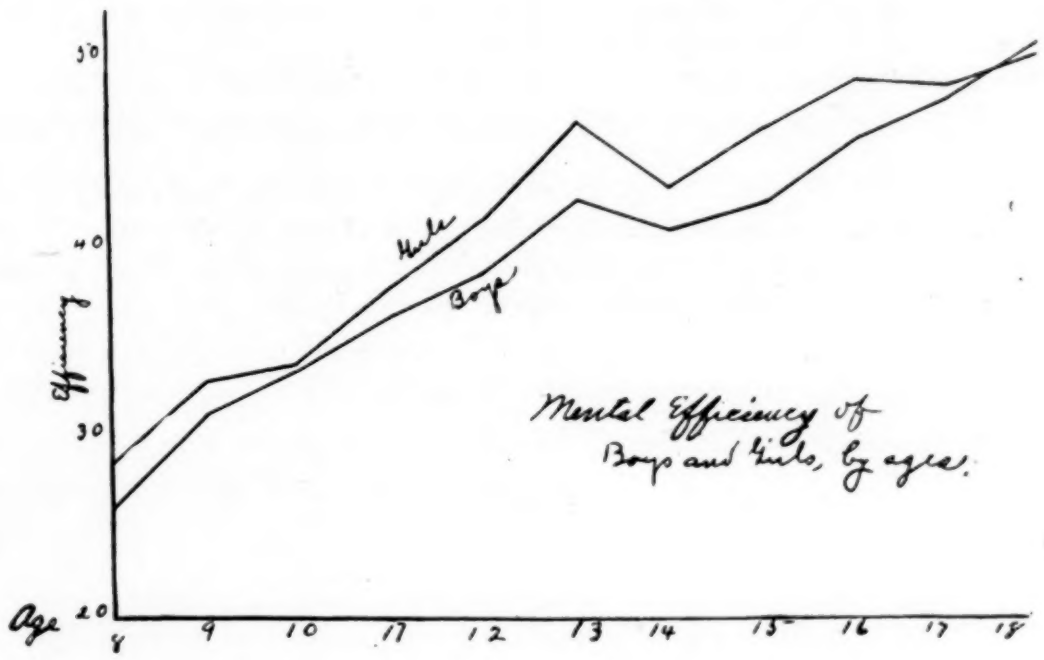
In Table II are combined the results of the various tests, and the average standing for the different ages for both sexes are shown in the lower horizontal columns. The relative standing of boys and girls in a given test can be determined by reference to the averages at the right. The comparison of the two sexes can also be noted by reference to the curves. Now, these figures and the curve are given, not in the belief that they have any permanent value, but as indicating the sort of thing that will soon be a possibility. That we are very nearly able to prescribe a definite and workable system of mental tests is certainly true. It is the belief of the writer that these tests, when once we have them, will be a few simple tests of mental functions as indicated above that can be given to children of all ages, with possibly a different length of time for the older children. With such a scheme we shall be able to compare directly a child's standing in any particular aspect of mind with the norm, and also his total mental efficiency with the norm of the age.

The advantage of the plan here proposed over the Binet-Simon series of tests is that the tests that we propose are group tests and can be administered to all the pupils easily and with accurate results, and, besides, ought to give much more definite information as to the peculiar mental characteristics of the various pupils. Some such scheme as we have outlined will suffice for the school as a whole. The extreme variants, both the subnormal and supernormal, could and should have further and more extensive tests to supplement these.

It will be noticed from the graph that the curve falls from 13 to 14. This is probably due to the fact that there is a partial selection in the subjects. Not many high-school pupils are included in the tables. Many 14-year-old pupils are in the high school. Those that remain in the grades doubtless aver-

age lower in ability than do those that have gone on to the high school. There is, of course, much selection in the later high-school years, 18 and 19. That those remaining in the high school during these ages have higher ability than those that drop out it would be hazardous to say.

It will also be observed that the average ability of the girls is greater than that of the boys. In logical memory, in which the greater number of pupils were tested, there is not a single




exception. The curves based on the averages come together between 17 and 18, but the number tested at these ages is too small to give this any significance. At the explanation of this superiority of girls over boys we can only guess. It may be that girls develop a little faster than do boys at any age of childhood or youth; they would, therefore, average a little better than boys. There is also some reason to believe that girls, when given a task, in performing it work at nearer their maximal efficiency than do boys. Finally, the reader should be reminded again that these tests and tables are to be considered only as a working basis. The writer will be able shortly

to publish directions for performing these tests, and norms based on tests given to several thousand children of each age.

### References.

(1) William Brown. *Some Experimental Results in the Correlation of Mental Abilities.* British Journal of Psychology, Vol. III, p. 296.

(2) C. Burt. *Experimental Tests of General Intelligence.* British Journal of Psychology, Vol. III, p. 94.

(3) E. B. Huey. *Backward and Feeble-minded Children,* 1911.

(4) W. H. Pyle. *A Suggestion for the Improvement and Extension of Mental Tests.* Journal of Educational Psychology, Vol. III, p. 95.

(5) B. Hart and C. Spearman. *General Ability—Its Existence and Nature.* British Journal of Psychology, Vol. V, p. 51.

(6) L. M. Terman and H. G. Childs. *A Tentative Revision and Extension of the Binet-Simon Measuring Scale of Intelligence.* Journal of Educational Psychology, Vol. III, pp. 61, 133, 277.

(7) J. E. W. Wallin. *The New Clinical Psychology and the Psycho-Clinicist.* Journal of Educational Psychology, Vol. II, pp. 121 and 191.

(8) G. M. Whipple. *Manual of Mental and Physical Tests,* 1910. Should be consulted for description of tests used in this experiment.

# MENTAL ADAPTATION DURING THE SCHOOL DAY AS MEASURED BY ARITHMETICAL REASONING.—PART II.

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(*Continued from the January number.*)

## IV. Third Series of Experiments.

### 1. *General Plan.*

A third series of experiments was made in an infants' department of a school situated in a rather poor neighborhood in the south of London. The whole of a Standard I class, which contained all the Standard I boys and girls in the department, did the work. All these children were 6 or 7 years of age; the average age was 6 years 11 months, and the experiment began with 56 children. The tests were administered by the head mistress, who had had much experience of experimental work with young children.

### 2. *The Tests and the Method of Marking.*

Sets of problems were called out, one problem at a time, by the head mistress of the school, and the children wrote down the answers, and the answers only. The following is one such set, given as one of the preliminary tests, on the results of which the class was divided into equal groups:

1. There were 15 flowers in a vase; some were red and the rest were white. If 9 were red, how many were white? (One step.)
2. If there were 6 panes of glass in one window, how many panes would there be in 4 windows? (One step.)
3. Out of 12 plums I eat 2. I share the rest between two boys. If each boy gets the same number, how many does each get? (Two steps.)
4. Four rows of trees were planted, with 5 trees in each row. If 10 trees die, how many remain alive? (Two steps.)
5. A boy plays 3 games of marbles and wins 4 marbles each game. Then he loses 2 marbles. How many has he left of what he won? (Two steps.)
6. A girl threaded 6 red beads on a string and then 4 blue beads. Five of the beads came off. How many beads were left on the string? (Two steps.)

Maximum mark per test = 10.

All the sets of tests were constructed on the same plan. The sums set on every occasion were identical in principle, but the figures and wording varied with each set, the subject-matter of the corresponding problems being never twice alike. The order of the problems was also varied; for example, the type of problem used as number 1 of the first set became number 6 of the second set. The questions contained little, if any, numerical difficulty for these children. If they knew how to work the problems, they were nearly certain to get the right answers. At any rate, we had only the answers to go by, for it would have been absurd to ask these children *how* they did the sums, and to work them in full on paper would have introduced novel features, which I was anxious to avoid. Marks were given in accordance with the scale appended to the problems. Each rational step carried one mark.

### 3. *Chronology of the Experiment.*

The experiment began on Friday, September 1, 1911, the fifth day after the midsummer vacation. Seven problems were given, only one rational step being necessary for the solution of each problem. These "one-step" problems, however, presented so little difficulty to this class that the results would have been useless for experimental purposes. Accordingly these results were disregarded and sets of problems were used similar to those given above. Four sets of preliminary tests were given—at 11.30 A. M. on Tuesday, September 5; Wednesday, September 6; Thursday, September 7, and Friday, September 8. Though the procedure of writing down answers to problems given orally was well known to these children, they did not appear to settle down into their proper places at once. The marks for the first set of answers were consequently discarded. The preliminary tests, therefore, on which the class was divided, were those of September 6, 7 and 8.

A few children had been lost through absences, but we were able to pair off 25 children in each group. Then three final tests were given on Thursday, September 14; Friday, September 15, and Tuesday, September 19. The exigencies of the school arrangements rendered necessary the uneqnal intervals between the final tests.

Group A worked their final tests each day at 9.40 A. M., whilst Group B took a Reading lesson in the school hall under their own teacher. Both groups had, of course, worked together for the Scripture lesson, which occupies the first school period from 9 to 9.40 A. M. Then, at 10.25, Group B worked the problems, whilst Group A took the Reading lesson.

No other arithmetical work of any kind was done by either group on the days on which any of the tests were given.

### 4. *Results.*

The coefficients of correlation between the results of the first and second preliminary tests was + .78, and between the second and third + .78. The correlation coefficients between the results of the first and second of the final tests was + .84, and that between the second and third was + .79.

The total marks of the Group A series correlated with those of the Group B series to the extent of + .99 in the preliminaries and to the extent of + .88 in the finals.

Let me now show the comparative results of Groups A and B. First, I will show them in gross. Group A scored an average mark per child per test of 6.9 (mean variation 2.2) in the preliminary tests and 7.5 (mean variation 2.3) in the final tests, whilst Group B scored 6.9 (mean variation 2.2) in the preliminary and 7.9 (mean variation 2.2) in the final tests.

The group working at 9.40 A. M. improve on their preliminary record 8.7 per cent., whilst the group working at 10.25 improve 14.5 per cent. I will next give the comparative results test by test:

*Table V, showing the comparative results of Group A and Group B, test by test, in the preliminary and final tests.*

| | | Preliminary Tests. | | | Final Tests. | | |
|---|---|---|---|---|---|---|---|
| | | 1st. | 2d. | 3d. | 1st. | 2d. | 3d. |
| Group A. | Av..... | 6.6 | 6.9 | 7.4 | 7.4 | 7.5 | 7.6 |
| | M. V..... | 2.3 | 2.4 | 2.3 | 2.4 | 2.5 | 2.4 |
| Group B. | Av..... | 6.6 | 6.9 | 7.4 | 7.8 | 7.8 | 8.0 |
| | M. V..... | 2.4 | 2.3 | 2.1 | 2.2 | 2.0 | 2.8 |

I will next show how far these differences between the results of the final tests were common to the more as well as to the less proficient pupils of the two groups:

*Table VI, showing the results of Group A and Group B compared, section by section, in the preliminary and final tests.*

| Marks for 3 preliminary tests. | No. of children. | Av. mk. for 3 prel'y tests. 11.30 A. M. | Av. mk. for 3 final tests. 9.40 A. M. | No. of children. | Av. mk. for 3 prel'y tests. 11.30 A. M. | Av. mk. for 3 final tests. 10.25 A. M. |
|---|---|---|---|---|---|---|
| 28, 29, 30..... | 3 | 9.6 | 9.8 | 3 | 9.6 | 10.0 |
| 25, 26, 27..... | 9 | 8.7 | 9.3 | 9 | 8.7 | 9.5 |
| 18 to 24..... | 7 | 7.0 | 8.0 | 6 | 7.3 | 8.9 |
| 8 to 17..... | 3 | 4.3 | 4.2 | 4 | 4.5 | 5.0 |
| Below 8..... | 3 | 1.2 | 1.9 | 3 | 1.4 | 2.8 |

The differences between the results of the final tests seem steadily to favor the sections of the later working group.

## V. Fourth Series of Experiments.

### 1. *General Plan.*

A fourth series of experiments, now to be described, was carried out with the whole of a Standard VII class, of an average age of 13 years 2 months, in a municipal girls' school situated in a poor district in the southeast of London. As in other cases, a whole class, working under the same teacher and in accordance with the same syllabus of instruction, was set to do the work. Then, subsequently, one of the two equal groups continued the work early in the school session, while the other group did the same work late in the same session, and comparisons were made to discover which was the more favorable time. All the tests were administered by the teacher of the class, who had had a great deal of experience of experimental work with children.

### 2. *The Tests and the Method of Marking.*

We began the experiment with a set of problems which were too easy, and the results had to be discarded. The first set of problems actually utilized was as follows:

1. The charge for keeping 35 horses for 14 days was £52. At this rate what would be the cost of keeping a horse for one day? (Two steps.)

2. How much money should be paid to a blousemaker who works for seven hours a day for six days if she is paid 4d. a dozen for making blouses and makes three blouses in an hour? (Four steps.)

3. A woman had £84, with which she bought a piano, a bicycle and a ring. The ring cost twice as much as the bicycle and the piano twice as much as the ring. What did each article cost? (Seven steps.)*

4. A draper has 18 boxes, each containing 90 reels of cotton. Each reel holds 250 yards. How many aprons can be machined from this amount of cotton if the amount wasted is 40 yards and it takes 37 yards of cotton to do 36 yards of machining? On each apron there are nine yards of machining. (Six steps.)

5. Every five trees in my orchard yield 320 pounds of apples. I have eight rows of trees, with 15 trees in a row. The care of each tree costs me 3s. a year, and I want to make a profit of £100 on the whole orchard. At what price per pound must I sell the apples in order to do this? (Six steps.)

Maximum mark = 25.

The girls were required, not to solve the problems numerically, but to write down how they would solve them. One mark was given for every correct rational step which was on the way to a solution by any method. The marks for steps assigned at the end of each problem were assessed from the *general* method of attack. A few clever children, who "telescope" some of the rational processes, of course receive marks on the more generous scale.

All the other sets of tests contained problems identical in *principle* with these, problem for problem, but the wording and numbers were changed, and the subject-matter of the corresponding problems was also changed. Further, the order of the corresponding problems was changed from test to test.

### 3. *Chronology of the Experiment.*

The experimental work began on Friday, July 14, 1911, at 10 minutes past 10 in the morning session. On this date, and also at the same time on the following Tuesday morning, July 18, sets of problems were given which are not shown above. They were found to be too easy, and the results were too high to allow of any subsequent differential improvements to be adequately shown. These results were therefore discarded, but the tests performed a useful function as preparatory exer-

*The children found this sum very difficult, as, indeed, all children tend to do who cannot use algebraic or equational arithmetic. In such cases the sum has to be worked as a problem in shares. I incline to regard the final multiplication required of the value of the single share as rationally identical with the assessments of the shares before the process of division can be done: but the teacher was anxious that this, being admittedly a difficult problem for these children, should be marked in the highest possible way, consistent, of course, with the general system of marking.

cises, and doubtless "steadied" the preliminary tests whose results we *did* use for the purpose of dividing the class. The preliminary tests proper were given Friday, July 21; Monday, July 24; Tuesday, July 25, and Wednesday, July 26. They were all worked between 10.10 and 10.45 in the morning after short recapitulary lessons involving no arithmetical reasoning. The short oral lessons were, as is usual in English schools, preceded by a Scripture lesson, which lasted from shortly after the opening of school at 9 A. M. to about 9.40 A. M.

On the result of these four tests the class was divided into two equal groups. Children who would be likely to leave during the coming vacation were marked, so that they might be placed in opposite groups and, if possible, be paired.

On July 26 the schools "broke up" for their midsummer vacation. They opened again on August 28, and, after allowing four days for a resumption of general mental adaptation to school work, the final tests were begun. The days of the final tests were Friday, September 1; Monday, September 4; Tuesday, September 5, and Wednesday, September 6. These were given at 11.25 to Group B and at 10 A. M. to Group A. Whilst Group A were working their tests, Group B were studying Geography from their books in another room under another teacher, and whilst Group B were working the tests, Group A studied the Geography. At 10.45 came the 15 minutes' recreation interval, and after that a short oral lesson differing in subject on different days, but in no case involving any arithmetical computation or reasoning. No arithmetical work other than the tests was done on the dates given above. The children were told before commencing each fresh set of problems how many marks they had obtained before, but no errors were pointed out nor were the marks for particular problems indicated. The geographical work was not questioned on.

### 4. *Results.*

The preliminary tests were worked by 30 girls. The results of the first test correlated with those of the second to the extent of + .86, those of the second with the third to the extent of + .89, and those of the third and fourth to the extent of + .89.

The correlation coefficients for the final tests were, between the first and second + .91, between the second and third + .95, and between the third and fourth + .91.

The total marks for the A series correlated with those of the B series to the extent of + .97 in the preliminary tests and to the extent of + .81 in the final tests.

The average age for each group was 13 years 2 months.

The comparative results in gross of the work of Group A and Group B are as follows:

For Group A in the preliminary test the average mark per child per test was 13.0 (mean variation 3.8); for Group B it was also 13.0 (mean variation 3.9). In the final tests the corresponding marks for Group A—the earlier-working group—was 14.9 (mean variation 3.6), and for Group B—the later-working group—was 15.7 (mean variation 4.0).

Group A improves 15 per cent. on its preliminary record, and Group B improves 21 per cent. It is interesting to note that nearly the whole period between the preliminary and final tests was holiday.

I will show next the comparative results of Groups A and B, test by test:

*Table VII, showing the work of Group A and Group B compared, test by test, in the preliminary and final tests.*

| | | Preliminary Tests. | | | | Final Tests. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st. | 2d. | 3d. | 4th. | 1st. | 2d. | 3d. | 4th. |
| Group A. | Av. mk..... | 10.9 | 12.8 | 13.3 | 14.9 | 14.3 | 14.6 | 15.5 | 15.4 |
| | M. V..... | 3.4 | 3.6 | 4.5 | 3.7 | 3.2 | 3.8 | 3.6 | 3.4 |
| Group B. | Av. mk..... | 10.7 | 12.5 | 13.8 | 14.9 | 14.9 | 15.3 | 15.5 | 17.0 |
| | M. V..... | 3.3 | 3.8 | 4.0 | 4.5 | 3.7 | 3.8 | 4.6 | 3.7 |

Finally, I propose to show the work of the two groups compared, section by section:

*Table VIII, showing the work of Group A and Group B compared, section by section, in the preliminary and final tests.*

| | Group A. | | | Group B. | | |
|---|---|---|---|---|---|---|
| Marks in 4 preliminary tests. | No. of girls. | Av. mk. per child per test in 4 prel'y tests. | Av. mk. per child per test in 4 final tests. | No. of girls. | Av. mk. per child per test in 4 prel'y tests. | Av. mk. per child per test in 4 final tests. |
| Over 65..... | 3 | 18.5 | 19.3 | 3 | 18.1 | 21.6 |
| 45 to 65..... | 3 | 13.3 | 15.7 | 3 | 14.6 | 17.0 |
| 35 to 45..... | 3 | 10.3 | 9.8 | 3 | 9.7 | 11.0 |
| 25 to 35..... | 2 | 7.5 | 15.0 | 2 | 7.7 | 11.6 |

It will be noticed that the number of children is considerably diminished from the number with which the experiment commenced. There were eight children marked as likely to leave during the summer vacation, and they had been fairly adequately paired in opposite groups. One of the girls, M. R., at the bottom of Group B, who was marked to leave, did not do so, whereas K. H., at the bottom of Group A, also marked to leave, had done so before the final tests were given. M. R.'s results were, therefore, not included in the above summary. The average mark for the third section of Group A contains that of K. W., who was absent from school the first week after the summer holiday, and therefore worked her final tests below the "form" of the other girls. The mark for this section should, therefore, be a little higher. The mark for the last section of Group A is also unsatisfactory. One of these two girls, R. A., worked her four preliminary tests in July with the following results: First test, 6; second, 7; third test, 8; fourth test, 9. In September she worked her four final tests, with the result that she obtained 15, 19, 20 and 17 marks from the first to the fourth, respectively. This is an unprecedented improvement, and it seems likely that some important factor was influencing this result apart from any question of a favorable or unfavorable time; indeed, for Group A, there was practically no change in the time from the preliminary to the final tests.

It is probably worth noting that the factor of habituation, if it operates at all, does so in favor of Group A; yet, notwithstanding this, the advantage in the final tests is found on the side of the later-working group.

## VI. Fifth Series of Experiments.

### 1. *General Plan.*

A fifth series of experiments was carried out in a boys' school situated in a very poor neighborhood in the southeast of London. The work was done with the whole of the First Class, of an average age of about 12½ years. On the ordinary school grading they would have been classified as Standard VI, a, and Standard VII. Work of this kind, dealing with

children of approximately this age and mental level, has already been described, but the present investigation was not superfluous, for the circumstances of these boys were exceptional. Three-fourths of them rose early every morning, and half of them were at work at 6.30 A. M. daily. It would not seem improbable in such cases that the highest mental adaptation would show itself earlier in the morning, and that a time chosen for severe mental work near the end of the morning session at school would be likely to be less favorable. To test this hypothesis the class was divided into two equal groups on the results of some preliminary tests, which were worked about the middle of the morning session. Then, subsequently, one of the two groups continued the tests as early in the morning sessions as school regulations allow, namely, at 9.40, immediately after the Scripture lesson, whilst the other group continued them late in the morning session, namely, at 11.30. Comparisons between the work of the two groups, when working at the same time and when working at different times, were instituted, as in the experiments previously recounted.

It has been suggested to me that if I had put into one group all the boys who went to work early in the morning before beginning school at 9 o'clock, and in the other group all those boys who did not do so, I should have obtained some valuable comparisons. This might have been so, but I could not, in that case, have worked by the method of equal groups, for of the first ten boys in the class in arithmetical reasoning no less than eight were boys who began their day's work at 6.30 A. M. It is true that the two boys at the bottom of the list also went to work very early; but, on the whole, the greater natural ability of the "working" boys would give them the pre-eminence, whatever time in the morning the work was done. In order, therefore, to get the groups equal, it was necessary to divide the class without regard to the existence or non-existence of early morning work. The teacher of the class was a young man of vigor and capacity. He had had a good deal of experience in experimental work, and all the tests were administered by him.

## 2. *The Tests and the Method of Marking.*

After one or two sets of problems had been tried unsatisfactorily, the following set was constructed and found successful. Perhaps a word may be of service as to the failure of the preceding tests. The test must be of such a nature that there is plenty of room for improvement, for we are working from a basis of differential improvement, it will be remembered. Therefore, it must be rather hard. But it must not be so hard that the children can do little at it, for in such a case we find them all "slumped" together at the bottom of the lists. Also it is important that the marks shall run gradually down from the best boys to the worst, otherwise it is extremely difficult, if not impossible, to get corresponding pupils nicely paired in the equal groups; indeed, it is difficult to get really equal groups at all. The following problems, however, seemed to be satisfactory:

1. A load of hay costing £5 10s. and 16s. worth of cake last a cow six weeks, during which time the cow gives 3¾ gallons of milk per day, sold at 1½d. a pint. What is the weekly profit? (Seven steps.)

2. A horse and a dog commence running side by side. The horse takes 522 strides in half a mile. Supposing the dog to take 11 steps to every 3 taken by the horse, find the length of the dog's strides. (Three steps.)

3. A man bought 120 cows in Holland, paying £9 7s. each for them. Their carriage to London was one-thirty-fourth of their cost price. He then exchanged them for 105 ponies, which he sold for £13 10s. each. What did he gain? (Five steps.)

4. I buy 325 sheep at 27s. 6d. each and 48 lambs at 15s. each. Just 13 weeks afterwards I sell the sheep at 39s. 3d. each and the lambs at 22s. 9d. each. If the cost of their keep is 6d. for each animal a week, what is my gain? (Ten steps.)

5. A school boy receives 6d. weekly while at school, but he has to pay away 4d. every five school weeks. Supposing there are 40 weeks in a school year, how much will he have had for himself in three years? (Six steps.)

6. There are 1259 men, women and children in a train. The men and women together number 1146; the women and children number 982. How many are there of each? (Four steps.)

The boys were not required to work the problems, but to state clearly how they would work them. Their work was marked in the usual way. Every rational step indicated which was on the way to a correct solution by any method received one mark. If a boy "telescoped" into *one*-step processes which, when analyzed, were really *two* rationally, he, of course, received the marks on the more generous scale. For some

purposes it might fairly be argued that such a boy should receive more than two marks, but the question is of little practical importance so far as these tests are concerned. It will be noticed that the system of marking adopted gives a total mark of 35.

### 3. *Chronology of the Experiment.*

It has already been stated that several sets of tests were given before we finally found a set which was suitable. This preparatory work, however, was by no means wasted, for the children gained facility, and, what was more important from an experimental point of view, settled down rapidly into their proper places when the actual preliminary tests were given. There were four of these preliminary tests, given from 10.15 A. M. to 10.45 A. M. on Thursday, August 31; Friday, September 1; Monday, September 4, and Tuesday, September 5. The preceding lessons were Scripture and Silent Reading. During the latter lesson the children were acquiring information subsequently tested. There were also four final tests, but in these one of the two equal groups—Group A—worked their tests from 9.40 to 10.10 A. M., whilst Group B "read up" a subject on which, in another lesson, they were required to write an English composition. From 10.10 to 10.45 for both groups, the lessons, though different on different days, were always oral lessons. The recreation interval occurred between 10.45 and 11 o'clock. From 11 to 11.30 the lessons were Geography on Friday, History on Monday and Tuesday, and Physical Exercises on Wednesday. It would probably have been more satisfactory to have moved the lesson on Physical Exercises to the afternoon, but that point was overlooked until it was too late to change the lesson. From 11.30 to 12 o'clock Group B worked the problems previously worked by Group A, whilst Group A "read up" for composition.

The four final tests were given on Friday, September 15; Monday, September 18; Tuesday, September 19, and Wednesday, September 20.

4. *Results.*

The coefficients of correlation in the preliminary tests, worked out from the individual cases by the moment-product formula, were, between the first and second, + .77; between the second and third, + .69, and between the third and fourth, + .77. The corresponding coefficients of correlation between the final tests were + .77, + .93, and + .73.

The coefficients of correlation between the total marks for the Group A series and the Group B series were, in the preliminary tests, + .94, and, in the final tests, + .86.

Three boys belonging to the group working at 11.30 were absent in the final tests, so the work of the three boys who corresponded to them in the group working at 9.40 was omitted. There then remained 13 pupils in each group.

The average mark per child per test for Group A in the preliminary tests was 26.8 (mean variation 3.2), and in the final tests 29.6 (mean variation 3.1); for Group B the corresponding marks were 26.8 (mean variation 3.1) and 29.2 (mean variation 3.0). The group working at 9.40 improved on its preliminary record to the extent of about 14 per cent.; the group working at 11.30 A. M. improved on its preliminary record to the extent of 9 per cent., which gives a difference of 5 per cent. in favor of the earlier working group.

I will next show the comparative work of the two groups, test by test:

*Table IX, showing the work of Group A and Group B compared, test by test, in the preliminary and final tests.*

| | | Preliminary Tests. | | | | Final Tests. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st. | 2d. | 3d. | 4th. | 1st. | 2d. | 3d. | 4th. |
| Group A. | Av. mk..... | 23.0 | 26.5 | 28.1 | 29.5 | 27.1 | 30.4 | 30.5 | 30.5 |
| | M. V..... | 3.8 | 4.7 | 2.9 | 3.3 | 4.0 | 3.4 | 2.9 | 3.0 |
| Group B. | Av. mk..... | 22.8 | 26.5 | 28.4 | 29.5 | 27.4 | 29.0 | 29.8 | 30.4 |
| | M. V..... | 3.9 | 4.0 | 2.8 | 2.9 | 3.3 | 2.8 | 3.0 | 2.9 |

There certainly seems some advantage on the part of the earlier working group, but it is rather undecided, and it may be well to analyze the results, section by section, to see how far it is common to the more proficient as well as to the least proficient pupils:

*Table X, showing the work of Group A and Group B compared, section by section, in the preliminary and final tests.*

| | Group A. | | | Group B. | | |
|---|---|---|---|---|---|---|
| Marks for 4 preliminary tests. | No. of boys. | Av. mk. per boy per test in 4 prel'y tests. | Av. mk. per boy per test in 4 final tests, 9.40 to 10.10 A. M. | No. of boys. | Av. mk. per boy per test in 4 prel'y tests | Av. mk. per boy per test in 4 final tests, 11.30 to 12 A. M. |
| 120 and over..... | 3 | 31.8 | 33.4 | 3 | 31.7 | 33.1 |
| 110 to 120..... | 3 | 28.9 | 32.6 | 3 | 29.0 | 31.3 |
| 100 to 110..... | 3 | 25.8 | 27.8 | 3 | 26.0 | 27.9 |
| Below 100..... | 4 | 22.3 | 26.0 | 4 | 22.1 | 25.7 |

In the case of every section we find the children working their final tests earlier in the morning have made a greater advance on their preliminary work than those working later. It is true that a factor of habituation, if it is operative, would work in favor of the earlier working group, for the arithmetic lesson is usually given at the earlier hour. But, in other cases, this factor, if it exists, has not been able to overcome the advantage consequent upon the greater general mental adaptation of a later hour. It is suggested that the opposite result in this case is due to the fact that no less than 12 of the boys whose work is summarized in the above table began work every day at 6.30 A. M.

## VII. Pedagogical Conclusions.

If the conclusions arrived at throughout this series of experiments are well based, a very considerable change in the present arrangements of school time-tables seems desirable. Whereas, in the previous experiment conducted by similar methods,* the results were in agreement with the best current pedagogy, those of the present research are in flat contradiction to it. The earlier in the morning the better is the opinion which governs the place of problematic arithmetic in school time-tables at present.

It is true that in elementary schools in England the first school lesson is Scripture, but that fact is due to historical

*W. H. Winch: *Mental Fatigue in Day-School Children as Measured by Arithmetical Reasoning*, British Journal of Psychology, December, 1911.

reasons, and not because the Scripture lesson is regarded as specially suitable for rapidly producing a vigorous state of general mental adaptation. Then in most cases follows problematic arithmetic.

These experiments seem to indicate that a later hour in the morning would be more suitable, in consequence, most probably, of greater mental adaptation at a later hour in the morning. But in classes containing many children who rise early and go to work before coming to school the present early hour for problematic arithmetic is probably better than a later one. In the cases of those children the maximum of mental adaptation appears to be reached earlier than in the case of children who do not work before coming to school.

# THE CHILD'S SPEECH.

## V. The Mastery of the Tongue.

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1. The beginnings of articulate speech lie, as has been pointed out, in certain mental predispositions which appear as the correlate of processes of physical development in the child. It is prepared for in the inherited momentum of neuro-muscular organization, which provides the indispensable mechanism of utterance, and in the imperious craving for exercise which accompanies all such processes of functional maturation. With each organ is given an aptitude for its exercise and an occasion for its use.

Speech is thus as natural to the child as flying to the bird; the function in each case rests upon a specific physical basis which is in preparation long before the activity appears. Speech is the medium in which the child's spirit is to live and move. It envelopes him as the air surrounds the nest. While as yet he knows nothing of its import, this significant medium subtly stimulates and excites him. As the young bird half rises in the nest when the breeze stirs his feathers, and his wings quiver with anticipated flight, so does the child respond to the speech of those about him and thrill with awakening utterance long before its forms have been apprehended. In a dumb, confused way he finds himself from the outset at home in this new world, for satisfaction attends the exercise of any native power.

This group of inner factors is supplemented by a system of stimuli which the world about him affords. The child is prompted to speak by urgent practical motives as well as by the esthetic rewards which successful utterance brings. He craves speech, and at the same time it is demanded of him; he is constitutionally prepared to exercise it, and its practice

is incessantly thrust upon him. Under such conditions progress should be rapid and attainment high. The greatness of the child's accomplishment in the acquisition of speech can, indeed, scarcely be exaggerated, and the swiftness of his advance from infancy often leaves the observer breathless, but the extent of the period which is occupied by the process and the varied and persistent nature of the attack which the child makes upon its difficulties are sometimes greatly underestimated even by those who are more directly interested in his development.

2. Before the end of the first month the infant shows clearly marked interest in sounds at large, and in the course of the second month his study of speech may be said to arise. Early in that period he begins to watch the face of the speaker, moving his own lips the while and shortly making responsive sounds. During the next two or three months this activity undergoes a rapid development, spontaneous variation supplementing direct imitation, so that by the beginning of the fifth month the child has commonly uttered most of the sounds of his mother tongue. During the second three months of this first half year the child's inarticulate cries have become the conscious means by which a number of specific needs are indicated and their satisfaction secured. Early in the second six months the substitution of articulate sounds is already under way, and before the close of the year his speech attains the stage of combined phrases.

It is during this second half year that the habit becomes prominent of stringing together a chain of syllabic sounds in rapid and repeated utterance, often so fluent and melodious as to form a charming imitation of intelligible speech. At the same time it is as true that the child is sparing of speech at this age as that he is prodigal of sounds. Words do not now form, as they characteristically do for the adult, a running commentary upon his own actions or thought. He breaks silence only under the tension of feeling or in active emergencies.

Words have another value which in individual development is prior to their utterance. They are names—means of identifying things—but to know the name does not necessarily mean

doing anything to the object or with it. It is a mark, one of many, by which the thing may be indicated when present or recalled in its absence. Before he thus uses them himself the child shows his familiarity with the names of many objects, and he understands much of the speech he hears before it becomes a habit of his own thus to describe the things with which he deals or to formulate his purposes verbally. While the primacy of understanding in the acquisition of speech is clear, it should also be remembered that the margin of individual variation between the two phases is great, and that fluent utterance may be considerably delayed without becoming indicative of any abnormal condition of speech or backwardness in general mental development.

3. Even when the habit of utterance has been established—that is, when it has become a custom for the child to describe his experience and formulate his purposes in verbal terms—his expression is still beset by many obstacles. He is struggling with a medium of expression which not only presents mechanical difficulties in the complicated process of utterance, but involves an even greater initial problem in the intellectual formulation of experience which conditions it. The child is learning to think as well as to speak, and perplexity in the one case shines out as luminously in his halting utterance as incoordination in the other. The correlation of these two facts should never be forgotten. The child must learn to think in order that he may speak, yet articulate utterance is itself the very means by which in general he clarifies and fixes his own meaning. The nature of the underlying thought is thus fundamental to the character of human utterance. If the child is to speak intelligibly, he must be taught to think clearly. That desideratum once secured, appropriate expression may almost be said to follow as a matter of course, for clear, accurate thought will always find some form of simple and direct speech in which to clothe itself.

Nevertheless the history of articulate expression in individual development is long and complicated. As a specific function it is part of systemic development, and the status of general psycho-physical organization in the individual has a significant bearing upon its course. In itself it is a complex

process involving sensory perception as well as muscular control, so that articulation cannot properly be considered by itself. Further, the use of the imagination, as well as the immediate interpretation of sensory facts, is involved both in the understanding and the use of human speech. Finally, in the course of its establishment articulate speech appears as but one element in a manifold system of materials upon which the child freely draws in making his meaning plain, and these supplementary activities modify and may definitely retard the progress of speech itself.

4. It must be remembered that the acquisition of the capacity for articulate speech is only part of a more general process, the full story of which includes both the development of general voluntary control over movement and the maturation of intelligence in imaginative and reflective activities alike. In every field development is going on along with that in speech, and these advances reflect an essentially unitary progress. Children often write incorrectly the sounds they have difficulty in speaking. Stammering and stuttering are much more frequent among boys than girls, and a similar predominance of ataxic writing is found in their exercises. The child that stumbles in his speech is clumsy in other ways as well. Stammering is associated with a general tendency to blustering. The precocity of speech in girls is but one phase of a superior neuro-muscular organization in general.

The development of voluntary motor control in the body at large follows a similar course to that of speech, and reflects the same stages of development in intelligence. Random movements of the hands, for example, are followed first by clutching when objects come within hand-grasp, and the latter by active, though at the outset vague, movements of reaching and exploration which come more and more under the direction of the eyes as associations are formed and attention defines itself. The movements thus made are at first elementary. The body as a whole is rolled toward its object or merely stimulated to pervasive trembling by its presence. Later the hands are stretched to grasp, and the feet, pushing or creeping, help the body toward its goal. The grasping is at first clumsy, but one after another thumb and fingers are sep-

arated from the elementary fist and receive opposed and independent motions. By the eighth month the hands are used separately. One group of fingers is capable of holding to an object, while another, with the thumb, feels for a different one. The use of instruments appears, such as reaching with a spoon, and the child begins in a variety of ways to imitate his mother.

In all these aspects alike the main features of development are reflected. The elements of movement are being mastered through repetition and combined in groups and series. The field of sensory complexes is organized and associated with adaptive reactions. Attention is sharpened and memory enriched, providing a basis for the practical use of the imagination, and with the rise of constructive activity comes an increasing variety and freedom in the child's expression. Speech, indeed, may be said to represent the significance of this whole process, for in it the individual sums up his knowledge of the objective world and through it he makes articulate his own ideal and practical ends. In all cases which present special deficiencies in speech, therefore, it is important to study the condition of the child's neuro-muscular organization at large and to stimulate his mental development by general exercises instead of confining attention to speech co-ordination alone.

5. The latter process is in itself one of extreme psychological complexity, and the conditions under which it arises are such as to increase rather than lessen the intrinsic difficulties which it presents. The child, in the first years of speech, is learning new words very rapidly. These are often long, or contain difficult combinations of sounds. As he hears them they are spoken rapidly and in continuous discourse. In his attitude attention to sense rather than to sound is characteristic; perhaps never, under natural conditions, is attention directed to the sound alone. If the child repeats the word, he is likely to do so not in isolation but as part of a context, all of which claims his attention. If reproduced alone, he must still rely upon memory of an experience of very complex character. If he is to reproduce the word, he must recall it as a whole and depend upon this memory for both the specific

sound-form of its constituent parts and for their serial order in the word-whole. In doing so the movements of the vocal organs in forming any given part of the word may be modified by the influence of a movement just made or by that of a movement about to be performed.

What wonder, then, that the child, eager to speak, caring always for his ideas and their expression, not for the form of his speech as such, should fall into confusion in his articulate utterance and thereby introduce many characteristic modifications into his speech. The whole neuro-muscular mechanism upon which speech depends is in unstable equilibrium. It has not yet established fixed habits of functioning, and is subject to manifold irregularities. All forms of mental shock or tension disturb it, such as fear, embarrassment, fatigue, etc., and every intellectual difficulty arrests its orderly course. Thus out of the natural processes of development incoherencies of speech in many forms may arise.

Such temporary disturbances of functional balance, especially if recurrent, tend to set up a nervous habit in which the irregularities of utterance, due to points of increased stress, are exaggerated and fixed. The consequence may be either a persistent type of stammering, a habit of blustering, or even a definite stuttering.

6. The child meets the difficulties of articulation in many ways. Words are transformed in sound or modified in use. Speech is made pliant and expressive through inflection or musical intonation, while varied and abundant gesture supplements the deficiencies of the child's vocabulary. He points to what he wants when the name is lacking; verbs are acted out in pantomime, while other words are spoken; dramatic emphasis corrects the misapplication of terms, and when words altogether fail his meaning is expressed in vivacious pantomime. In all this the child is a natural and admirable polyglot. He has many languages, and draws upon his rich materials of expression with freedom and effectiveness. The very wealth at his command stands in the way of unhampered development in articulate expression.

Advance takes place by gradual transition. The forms of inarticulate expression disappear one by one as the child mas-

ters the elements of speech. Differentiation into successive stages can thus be made only in virtue of the amount of substitution of conventional for natural elements which has taken place at given points in the child's progress. As the range of concepts extends and acquaintance with the system of articulate signs by which they are expressed increases, both the pantomimic accompaniment of speech and the expressive modulation of tones undergo decline. The language of the adult, practically as well as esthetically, must indeed be considered a degraded form of expression in proportion as it has lost the flexibility of childhood. How much the music of speech adds to its intelligibility the adult usually fails to recognize, or he would more seriously strive to preserve this form of excellence which the speaking voice once possessed in such high degree.

7. The difficulties which beset articulation may be classified under many heads. Some sounds are difficult in themselves because their utterance necessitates complex muscle combinations; some are difficult because of their relation to preceding and following sounds in the web of utterance. For the articulation of certain sounds the young child is naturally incapacitated by the imperfection of his vocal organs, while the production of others is being made difficult through restriction of exercise to the limited range of elements which any one tongue comprises. Sometimes utterance is arrested by a permanent defect in co-ordination; at others it suffers temporary derangement from excitement, fatigue, and the like. Each of these difficulties may call for its own individual mode of approach, and methods must be adapted to all such specific differences, but the general character of the child's attack upon his problem may be indicated in terms of a few simple concepts.

In the most general terms every change which the child introduces into his speech may be called a simplification of the form of utterance, but this process appears in a variety of particular modifications. The simplest is omission; the difficult elements are dropped and the child uses only those which he can successfully utter. In some cases words or whole phrases are thus omitted and the sentence form reduced to a substan-

tive, a word of action, or a simple exclamatory term. In others the change affects only the structure of individual words, from which initial or final syllables are dropped, a single impressive sound sometimes doing duty for the whole polysyllable in which it appears.

These omissions, as, indeed, all the modifications here mentioned, leave the substance of thought unaffected. The child commonly means the word—the whole word as the adult utters it—when he thus mutilates its form, and he may intend what the whole syntactic form means for us when he uses a "sentence word." The question is one of difficulty in the motor reaction, not of complexity in the thought it accompanies.

When the sound is attempted instead of ignored, the change introduced may be due to its own phonic character or merely to the context in which it appears. In the first case a simpler sound is substituted for that which presents difficulty. The relation of such pairs of sounds has been exhibited in various physiological alphabets. In the second case one of the sounds in question—not necessarily the simpler of the two—is modified in character because in the succession in which it appears the altered form involves a less complex process of muscular adjustment. For example, it is easier to repeat a sound which has just been uttered, since the vocal organs are already prepared for its reproduction, than it is to pronounce a different one, which of necessity calls for a readjustment of the muscle complexes.

It is this principle which accounts for assimilative changes in human langues as well as for phonic reduplication in the young child's speech. Other modifications than those arising from articulatory difficulties embody the same process of simplification, such as the restriction of utterance to a series of synthetically simple sentences, but these lie beyond the limits of the present paper.

8. In the acquisition of speech all these difficulties must be mastered and the syncopations, assimilations and other mutilations which mark the child's speech eliminated. Ordinarily this rectification takes place unreflectively. The change is a consequence in part of the organic development and organization which is under way, and in part results from the child's

incessant practice of speech in daily life. The influence of the latter factor is not restricted to the period or the occasions when the voice is used as a means of intelligent communication. It begins far back in the first year of life, before the child has anything to say or suspects the meaning of the articulate sounds he hears. The voice is a simple plastic instrument, always ready to hand, which he employs when alone as well as in company in a purely solitary way for his own gratification. In the course of this activity new vocal elements appear, sounds other than those owed directly to the mother's speech. The child's unreflective imitation of the tones of her voice is marked by variations due to the imperfections of his vocal organs, to lack of exact apprehension, to failure of retention and many other causes.

Besides these variations, his original tendency to express himself through the voice in both happy and unhappy experience persists and combines with the reflection of his mother's speech in a new, modified process. These spontaneous expressions, and even the failures in imtiation, become a point of origin for the production of new sound-forms. The child finds utterance indefinitely variable, and in his exploration of the field of its possible combinations a new world of delight is opened to him, with which he more and more occupies himself. The voice is the child's earliest plaything; long before he can use his hands in any constructive work or his mind in dramatic play the tongue has become a companion and a minister in his hours of solitude.

This incessant practice of the vocal organs, not aimlessly as in the first days of infancy, nor imitatively as when he echoes his mother's speech, but experimentally and esthetically, puts him, first of all, in possession of a great variety of articulate sounds which are not simply heard, but known through their production. Further, it puts him in possession of the capacity to make the movements necessary to produce the sounds in question, and thus largely extends the system of movements which are the immediate associates of speech. His utterance is thus greatly enriched, for he has the images of these sounds in mind and can recognize them, and he knows the movements involved in their production and can make them.

9. This unprompted activity of the vocal organs, in the next place, adapts the mechanism for its work in imitating more exactly and extensively the mother's speech forms. It is difficult to estimate in any definite way the importance of the part played by this factor in the development of speech, but the incessant babbling of the child, together with the great variety of combinations to which his activity gives rise, makes it appear that the process is a highly significant element in that stage of his speech development. Organic exercise is the basis of progress in the acquisition of speech, as it is in all forms of skilled movements, and only part of such practice at this stage is got in the actual attempt to reproduce the forms of articulate speech which the child hears.

It is only when especial difficulty exists that technical training in articulation must be resorted to, as when a new tongue is to be mastered by the adult, or the child is hampered by a defective mental or physical organization. In the latter case the method of correction varies with the particular origin and nature of the trouble. If the basis be organic defect, as in hare-lip, cleft palate, and the like, the recourse must be to surgical treatment; it is not a problem that falls within pedagogical method. If the condition be due to imperfect functional development or lack of exercise, stimulation, local massage, and especially systematic exercise of the muscles in respiratory control, vocal scales and production of the elements of speech, should be employed. The earlier all such exercises are begun, the greater their value. Any sound which the child fails to master at the outset is uttered with greater and greater difficulty as time goes by, and unless corrected becomes in the end a chronic defect of speech.

10. The psychological approach to this group of problems must begin with a recognition of the significance of preventive measures. A very great part of the defects which mark human speech is the mere product of unhappy tradition. It is the reproduction and perpetuation of a slovenly social habit of utterance which the child picks up by direct imitation of models whose deficiencies he does not discern and cannot even imagine. To have lived with those who use their own tongue well, because they love good speech and strive for it, is the first

condition of a sound habit and tradition in this respect. When the influence of such direct contact, in reading as well as speech, must be supplemented, the instructor will find at least three aids suggested by the psychological nature of the process involved in articulate speech.

In the first place, the child's attention may be called to the precise character of the sound to be produced as the most general condition of correct representation. Each word is a specific sound-form. To speak it is to reproduce this form with exactness. If the child have not heard the word distinctly, he cannot speak it correctly. If his mental representation of it be distorted, his utterance will reproduce the defect. To correct this initial vice the teacher must pronounce the word slowly, distinctly, precisely, and the child must be brought to listen to the sound, to note its exact character and to fix it in mind. For it is the sound he thus hears, or imagines he hears, which guides him, whether he be aware of it or not, in all his use of the speaking voiee.

In the second place, the child's attention may be called to the position and action of the vocal organs in producing the sounds he is trying to master. Each articulate sound is the result of contractions occurring in specific muscle groups combined in definite forms and successions. To alter in any degree the force of these movements, or to vary their order, distorts the form of the resultant sound. Mastery of speech thus implies the ability to make these reactions with complete precision and fluency. If the child can be shown that these movements must be made in just this way if articulation is to be correct, and that if he can only make these movements the right sound will follow, an additional means is given of attacking the problem of defective utterance. There are many devices by which the child may be helped to attain this end, such as watching the teacher while the word is pronounced with special emphasis on the movements involved, observing the position of his own vocal organs by means of a mirror and following visually the motions involved in uttering a given sound, representation by drawings, models, and the like. All such material should be drawn upon in turn according to its value in bringing about the desired result.

In the last place, the child's attention may be called to the character of the sounds he produces when his articulation is defective. It is the form of the resultant word-sound, not attention to the muscular tensions involved in its production, which primarily guides our attempts at vocal imitation. The muscular innervation is continuously modified in one direction or another until the right note is struck or the correct sound-complex attained. In some cases, as in singing, this product is the object of deliberate attention, but in other cases, namely in the use of the speaking voice generally, attention is systematically directed away from this point, since the individual is primarily interested only in communicating his thought. If the sounds he has uttered are fully understood, they have served their purpose, and no incentive remains to examine them critically and modify their character. It is his failure to make his meaning clear, and in a minor degree the amusement or ridicule his mistakes may arouse, which prompts the child to conscious effort in this direction. This element of method presupposes that first mentioned, since a specific defect can be recognized only by comparison with the correct model which the child must carry in his imagination. It is not on that account an insignificant aid in overcoming difficulties of articulation, and its use should be part of the cultivation of speech in the normal child as well as in the defective.

In all such instruction, however, it is practice which finally counts, and effective exercise cannot be got through occasional formal training, but only through habituation in daily conversation to the hearing and use of good speech.

(THE END.)

# COMMUNICATIONS AND DISCUSSIONS.

## A REACTION MACHINE.

The purpose of the apparatus is to afford an easy means of testing the reaction time of an individual to light, sound and touch by a machine which is small, compact and portable.

Most of the reaction machines[1] which are used in connection with the chronoscope are large and cumbersome. Other features of their construction often cause error in the reaction time. The light, which is used as a stimulus, is reflected from a mirror through a lens to a small opening in a screen behind which the S. sits. As the mirror is moved to control the light and to release the pendulum of the chronoscope, which is wired in circuit with it, experimenters not familiar with the construction find it difficult to keep the same adjustment throughout the entire experiment.

The sound stimulus is given by tapping a key. The E. has no control over this stimulus, so probably no two of the stimuli are given with the same intensity. This gives a chance for a wrong interpretation of the reaction, or at least, on account of this difference in intensity of the stimuli, is unfavorable to any comparison of the different reaction times.

The same error may occur in giving the touch stimuli. The E. gives this stimulus by touching the S. on the hand with a pointer wired in circuit with the chronoscope. Here, again, the intensity of the stimuli varies.

As it is necessary to have the chronoscope near the reaction apparatus, it is not unusual for the most careful S. to react to the sound of the release of the pendulum or some other silght sound from the apparatus.

This is avoided by the type of apparatus described here by having the S. placed in a darkened room before the reaction machine while the E. sits in another room before the chronoscope, gives the stimuli, and reads the reaction of the S.

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[1]The apparatus described here was made and used by the author in the department of Orthogenics at Indiana University. The defects named above are especially found in the Bergström type which was previously used.

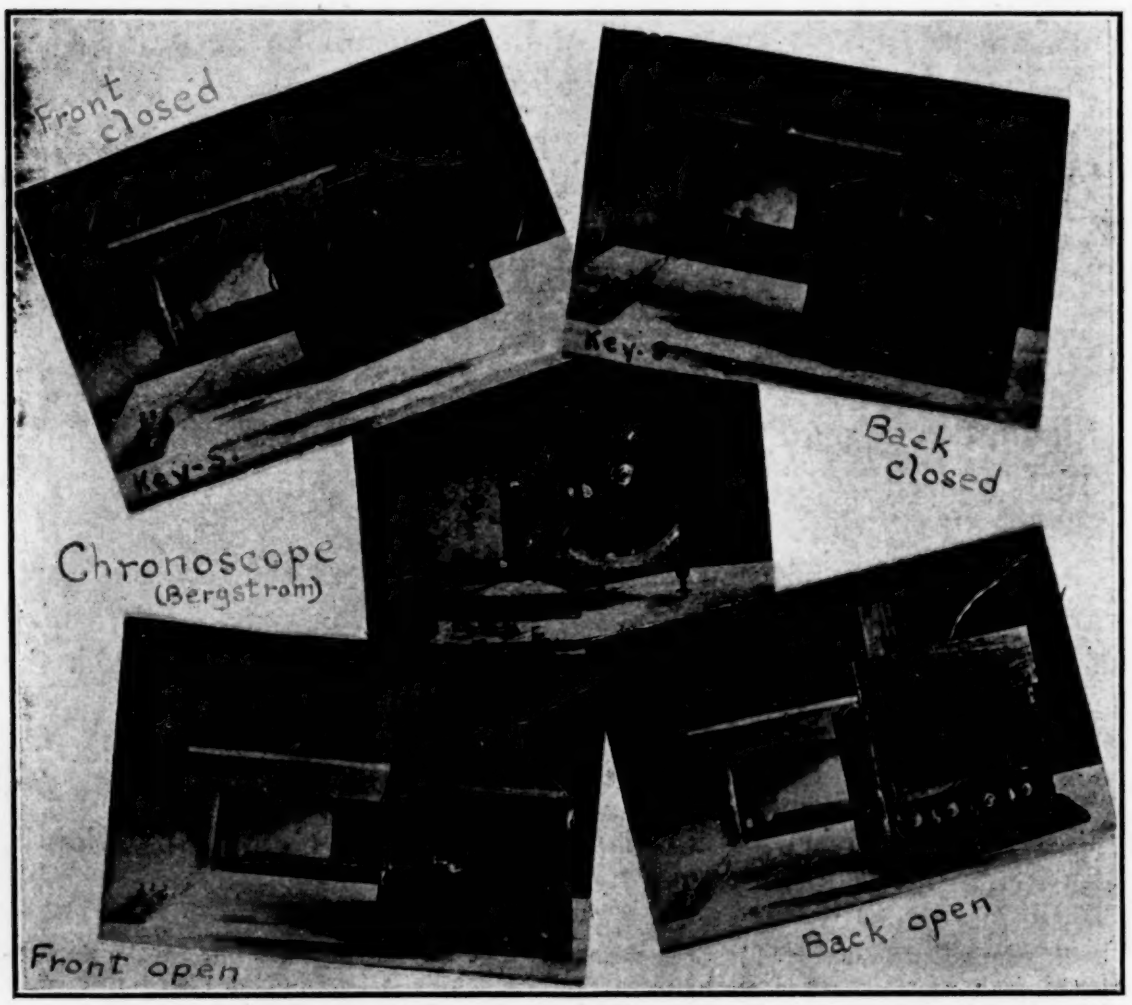
The apparatus is enclosed in a box 7½ by 9½ by 12 inches. The lower compartment, as shown in the illustration, contains four dry cells. In the laboratory, however, a storage battery or the regular direct current may be used.

The stimulus for light is furnished by a small tungsten bulb[2] (4 c.); the stimulus for touch by a bamboo pointer, and the stimulus for sound by the contact of a bar[3] with the two spools magnetized by the current. As the bulb and the spools are wired in circuit with the chronoscope and the E.'s key, the action of all is simultaneous. The S. reacts to the stimulus by pressing on another key in circuit with the pointer of the chronoscope.

By this arrangement all foreign sounds are eliminated, the action

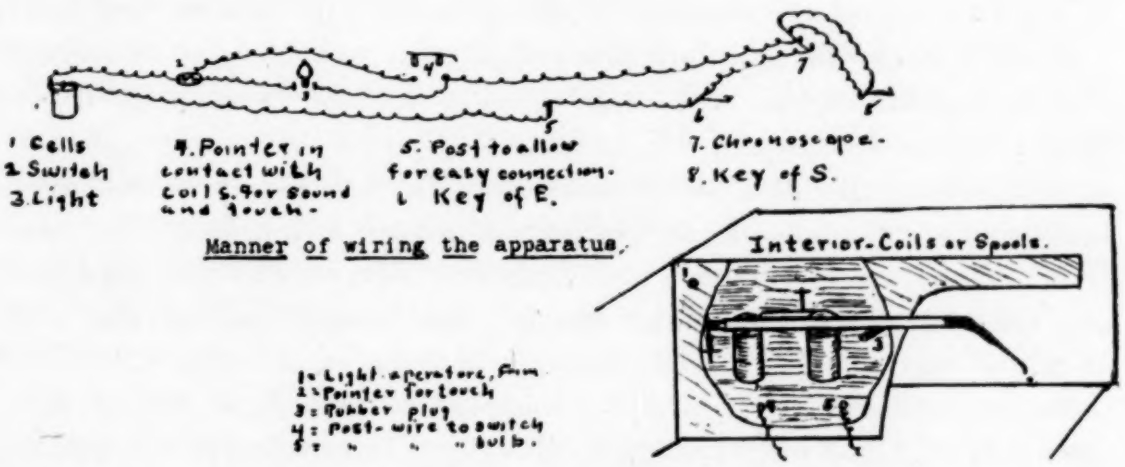
[2]The bulb is covered with a thin sheet of diffusion glass and the light is seen through an opening 5-m.m. in diameter.

[3]The common electro-magnet.



of all parts of the apparatus is simultaneous, and the intensity of the stimuli is always the same.

Two small coils similar to the spools found in the large electric bells or in the telegrapher's instrument were used in the part of the apparatus which furnishes the stimuli for sound and touch. A bam-


1 Cells
2 Switch
3 Light
4. Pointer in contact with coils for sound and touch.
5. Post to allow for easy connection.
6 Key of E.
7. Chronoscope.
8. Key of S.
Manner of wiring the apparatus.
Interior-Coils or Spools.
1= Light apparatus, from
2= Pointer for touch
3= Rubber plug
4= Post- wire to switch
5= " " " bulb.

boo pointer attached to the end of the bar in contact with the coils furnishes the touch stimuli, while a small rubber plug inserted beneath the bar prevents any sound. This rubber plug is removed when a sound stimulus is desired. As the piece to which the coil is attached is movable, the pointer can be adjusted to suit the size of the S.'s hand. When a light stimulus is desired, the electric bulb is thrown in circuit with the rest of the apparatus (the touch and sound parts being cut off at the same time) by means of the small switch placed conveniently in the front of the box.

J. E. Evans.

Columbia University.

## NEW USES FOR THE EWALD CHRONOSCOPE.

1. The Ewald Chronoscope (Spindler & Hoyer, No. 3, mk. 175) is a finely constructed electric make-and-break counter, with an index hand which may be reset at zero from either direction by the turning of a milled nut. It operates on a current of from 0.2 to 0.3 amp. (requiring a voltage of from 1.7 to 2.5 with the circuit closed), advancing the index hand one point at each closure of the circuit, and

under favorable conditions will work accurately to 100 closures per second. It is thus useful, with a 100-vib. fork, for timing simple reactions; but for this purpose a fork with especially reliable contact mechanism is needed. With an interrupter of slower rate (10 to 75 vibs. per sec.) the Ewald is a simple and easily managed instrument for the timing of association-reactions. An arrangement of the Ewald and accessories for this purpose will be described later.

2. The Ewald is an admirable counter for use with the steadiness tester, tapping board, and other testing devices which require the indication and counting of contacts. Whipple[1] prescribes the use of the kymograph and electro-magnetic marker for these purposes, because the counters of the ordinary type are not sufficiently sensitive.[2] The Ewald, however, is so sensitive that it will record almost any contact which a magnetic marker will record, and at any rate of which any member of the body is capable of moving. Two dry cells give sufficient current. No rheostat is needed, as this is open circuit work, and with but two cells there is no danger of burning the windings of the electro-magnet.

If mere indication of touches on the steadiness tester is required, without mechanical counting, we find a telephone receiver better than a telegraph sounder. One dry cell, of pocket size, operates the telephone very satisfactorily.

3. As a rotation counter, for electric motors, the Ewald is superior to anything we have heretofore used. The worm-gear counters, commonly used, are very unhandy in the timing, and they seriously reduce the speed, making it impossible to use them on small motors for color mixing.

We have a make-and-break mechanism attached to one of Stoelting's motors, and when this is connected in series with a cell of chloride accumulator, a G.-R. rheostat, a Morse key and the Ewald the counting of rotations is simple and accurate. The make-and-break mechanism is (a) a small cylinder, half brass and half rubber (longitudinal halves), attached to the back end of the motor-shaft, and (b) two brass springs, mounted side by side on a block of hard rubber attached to the motor frame, and pressing on the cylinder. Binding posts are mounted on the springs over the blocks. During half of the rotation of the shaft the springs press on the brass part

[1] Manual of Mental and Physical Tests, p. 100, *et seq.*
[2] *Op cit*, pp. 106-107.

of the cylinder, which makes connection between them. During the remaining half of the rotation the springs rest on the hard rubber, and the connection is, consequently, broken. As long as the Morse key is kept down, therefore, the index hand of the Ewald is advanced one point for each rotation of the shaft. This arrangement of apparatus permits the counting of rotations at any rate up to 100 per sec. (6000 per min.) without any difficulty.

KNIGHT DUNLAP.

The Johns Hopkins University.

## NATIONAL INSTITUTION FOR MORAL INSTRUCTION — A CORRECTION.

Managing Editor,
Journal of Educational Psychology.

My Dear Sir:—

Under the heading of National Institution for Moral Instruction Mr. Milton Fairchild publishes a large advertising folder. This contains reading matter relating to his lectures, to his lantern slides, and to other matters, together with some endorsements from educators and other men, of his Visual Instruction in Morals. My own name and that of the School of Education of the University of Kansas have been printed and thus exploited in these large folders as representing an official and professional endorsement of the whole scheme of Visual Instruction in Morals. In view of the fact that my name and that of the School of Education is being used despite my repeated and explicit declinations to express an opinion, I hope you will allow me this much of your space to correct a very misleading educational announcement.

Respectfully yours,

CHAS. HUGHES JOHNSTON.

University of Kansas.

# ABSTRACTS AND REVIEWS.

ALBERT MOLL. *The Sexual Life of the Child.* Translated from the German by E. Paul. With an Introduction by E. L. Thorndike. New York: The Macmillan Company, 1912. Pp. xvi, 339.

It is impossible to say whether good or evil comes from attempting to popularize the very uncertain knowledge that has been gathered by alienists concerning sex manifestations. To judge by the novels dealing with forbidden sex themes that have appeared on the Continent within the past decade (following the more or less popular accounts of sex perversions written by Kraft-Ebing, Moll and others), one might assume that the recognition given to these morbid manifestations by recognized scientists has encouraged laymen to reject the social disapproval with which these practices have hitherto been stamped. It is reasonable to suppose that, notwithstanding the sincere motive which underlies the scientific discussion of perversions, the mere fact that typical cases are accurately described in books that have a popular circulation will tend to break down the prejudice that society has built up against them. And it is beyond doubt that a vigorous social prejudice is the surest safeguard against any type of moral degeneration. There is a serious problem here that cannot be thrust aside by the dogmatic assertion that "truth never hurts."

The volume before us is relatively, although not entirely, free from the danger spreading contagion through the infecting influence of suggestion. It is evidently written from the most sincere and praiseworthy motives. Certain of its chapters might profitably be read by all who have to do with education of children. The concluding chapter on Sex Education is one of the best discussions of the subject in the literature. Education is conceived as something broader than mere instruction in the facts of sex physiology and hygiene. It includes fundamentally the development of the sentiments of modesty, shame, and disgust. The importance of keeping the attention from becoming engrossed with matters of sex is emphasized, and in this connection the influence of suggestive literature and pictures is helpfully discussed. Moll does not believe that the conventional form of religious education has an appreciable effect upon sex morality. Upon the side of positive enlightenment with regard to sex phenomena, the author contends that the objective phases should be treated first and may be approached in preadolescent years

through instruction in the biological sciences. The subjective phases should not be considered prior to adolescence, and enlightenment here is much better given by the parent than by the teacher. Reference to the danger of venereal infection should be postponed until later. The grave mental disorders that may arise from a morbid conscientiousness regarding normal or inevitable sex phenomena are frequently recurred to by the author, and constitute a part of the discussion that all parents and teachers would do well to read.

W. C. B.

W. PEPER. *Jugendpsychologie*, Leipzig and Berlin: B. C. Teubner, 1912. Pp. VI, 181. Ten Illustrations.

This book is designed by the author as the first introduction to psychology and child study. The pedagogical instruction of the first year, he believes, should have as its chief problem the awakening of an understanding and love for the developing child. The book is especially designed for normal schools (*Seminaren*) and similar institutions. Since it grew out of the author's work as a teacher, he hopes that it may be of practical pedagogical value (*Vorwort*).

The text is divided into four parts, entitled: (1) *Das Kind im Elternhause;* (2) *Die Eroberung der Welt in Schauen und Schaffen;* (3) *Das Kind in der Schule,* and (4) *Eigenart und werdende Persönlichkeit.* Each part is subdivided into a number of chapters. Many of the chapters are preceded by short quotations from various authors. References are also found at the beginning of each chapter. These references are, as a rule, not to standard writers on psychology, but rather to writers on literature. Chapter XVIII, on "*Das Gedächtniss des Kindes,*" might be regarded as a typical chapter. The references are: "Schlosz Voncourt" von Chamisso; Voge, Das Erkennen; Uhland; Eberhards Weissdorn; Chamisso, Salas Gomez; Iphigenie; Tells Monolog; Johannes zweiter Monolog; Keller, Der grüne Heinrich.

A number of questions designed to lead the pupil to a thoughtful consideration of the text and a professional point of view in observing children is found at the end of many chapters.

Dr. Peper has written one of the most comprehensive and readable books on educational psychology that the reviewer has read.

J. MACE ANDRESS.

State Normal School, Worcester, Mass.

LUCIEN CELLÉRIER. *Esquisse d'une science pédagogique. Les faits et les lois de l'education.* Paris: Felix Alcan, 1910. Pp. xiv, 393. Fr. 7.50.

This is a revision and amplification of a thesis submitted to the French Academy of Moral and Political Sciences, and awarded honorable mention by their jury. In his preface the author boldly avows that it is not his purpose to add to the number of "practical" treatises on education already crowding the shelves of our libraries. The book is rather an examination of the basal facts of all education, and attempts to derive therefrom the fundamental principles of educational procedure.

Education is conceived as a factor in the general phenomenon of development, and is defined as "the intelligent and voluntary intervention of parents in the development of the child's mental tendencies, in order that he may be adjusted to that environment which they consider best." There are thus three elements in the educative process: the educator, the subject and the environment. The discussion of the nature of these elements and of their relation to each other occupies the first half of the book, while the remainder is taken up with a consideration of the educator's mode of action and of the object of education.

The method of treatment is strictly deductive, and from the assumed data of the educative process the attempt is made to derive by rigorous logical reasoning the laws of pedagogical science. Consequently the treatment is somewhat formal. Recent studies in experimental pedagogy receive scant attention, and among the writers most frequently quoted are Kant, Herbart, Pestalozzi, Bain, Spencer and Compayré. J. C. B.

GEORGE W. JACOBY, M.D. *Suggestion and Psychotherapy.* New York: Charles Scribner's Sons, 1912. Pp. 355. $1.50 net.

This volume contains two main parts and an introduction. The introduction deals with the advantages and disadvantages of the popularization of medical science. In Part I attention is first given to certain general psychological and psycho-physical principles. What we find here is a passable exposition of the scientific trend of modern psychology, a description of the nervous system that is superior to that found in many psychological texts, and one section descriptive of ordinary, one of peculiar and one of disordered mental activity. The author is evidently more at home in neurology and

psychopathology than he is in psychology. The treatment in some places is somewhat disjointed and not entirely clear. The second portion of Part I sets forth the nature, scope and forms of suggestion, and recounts numerous historical examples of its operation, *e. g.,* wolf-madness, children's crusades, the temple sleep, mesmerism, religious fanaticism in recent times.

In Part II, Psychotherapy, we are first shown why psychic treatment of disease is justifiable, what its dangers are, and how important is the human equation both in physician and patient. The section on "Christian Science, Faith and Prayer Cures" is first-rate. Would that it might be read by all prospective converts to modern supernaturalism! The second portion of Part II deals with special applications of psychotherapy, and is especially pertinent because of its appraisal of current methods. Dr. Jacoby gives a good account of psycho-analysis and the doctrine of mental catharsis, but criticises the conclusions of Breuer and Freud, and holds that their results are forced and their methods impracticable for ordinary use. Mental relaxation and exercise, with positive suggestion, are better and saner methods. Still better is prevention of neurasthenia and other neuroses by psycho-prophylaxis. Neurasthenia is on the increase among children, though not, in Jacoby's opinion, on account of undue exactions of the modern school. At least the average child is not overburdened. For those who are mentally incapable of the normal pace "psycho-prophylaxis must endorse the establishment of special schools,"

While there are numerous points about this volume that would invite criticism were one disposed to estimate it from the standpoint of the professional psychologist, such comments would, perhaps, be ungenerous when the aim and prospective audience are considered. Teachers of psychology can recommend the book to students who are interested in suggestion and psychotherapy, and laymen can read it with profit. G. M. W.

WALTER ALBERT JESSUP. *The Social Factors Affecting Special Supervision in the Public Schools of the United States.* New York: Teachers College, Columbia University, Contributions to Education, 1911, pp. 133.

This is a pioneer study in the field of social education. It includes an account of the social forces, pressures, and sanctions back of the introduction of music, drawing, manual training, domestic science,

physical education, sewing and penmanship into the elementary curriculum. There is in addition to this a brief but important quantitative study of the situation in this country relative to the supervision of these subjects.

In his attempt to explain the operation of certain social forces and influences in education and the enrichment of the curriculum, Dr. Jessup succeeded in establishing, at least tentatively, certain theses. The first thesis is that shifts in our social point of view have been responsible for shifts in our attitudes toward the subject-matter and the methods used in each of these subjects of study. A study of occupational life during the latter part of the last century shows that there was a gradual change from agriculture and commercial pursuits to manufacturing. Parallel to this was the increasing tendency to urbanization. One obvious result of the increased density of population in the cities was the added opportunity for the specialization of labor, and the consequent disappearance of the old apprenticeship system. This division of labor affected the lives of women as well as of men. On the one hand it afforded a multitude of new opportunities for women to earn a wage, and, on the other hand, it released, because of changes in household economics, thousands of girls from the necessities of home duties.

The second thesis is that out of the stresses and strains of such new situations as these were born the sanctions for the new subjects of study. The practice seems to be almost without exception that each of the new subjects was introduced into the schools through the operation of forces and agencies outside the established public school system. Groups of progressive people recognized the necessity and urged the wisdom of providing instruction along these lines long before the teachers in the schools were willing to assume the burdens of them. In nearly every case it was necessary for individuals and non-educational associations to experiment with the new subject; the venture was supported by private funds, and at last, after a public opinion had been created that was so strong that it could not be withstood, permissive authority was given to try the subject in the schools.

The sanction back of nearly every subject of study was the satisfaction of some immediate utility. In every case they were intended to minister to the needs of a special vocation or a special class. It was not until the studies fell under the influence of educators that they received a general educational interpretation.

The third thesis is that the new subjects were made a part of the curriculum in the larger cities before they were made a part of the curriculum in the smaller cities, and in general they were made a part of the curriculum in the smaller cities before they were made part of the curriculum in rural districts. This generalization harmonizes with that well-known sociological principle that the curriculum increases in flexibility and in the variety of its appeals in direct proportion to the heterogeneity and massing of social groups. These larger places became the radiant points of conventional imitations; the current set in to the smaller places from them; and the ideas and practices found there filtered down to the more strictly rural districts with their homogeneous stable populations. It seems to be an established fact that new ideas and new practices tend to appear earlier in the cities and that the old tends to be clung to longer in the country.

The fourth thesis is that the school teachers as a class stood out against the introduction of these newer subjects on the ground that they were not cultural or would interfere with the "regular studies." They argued that the curriculum was already overcrowded, that the fundamental studies were not receiving their fair share of attention, and that they themselves were not prepared to give instruction in the new studies. But the inertia of the teaching population and the crust of conservatism were finally overcome or broken through by a public opinion created by special groups to conserve some public utility not heretofore provided for in the established and traditional curriculum. When the subjects were forced in, the teachers, as a rule, neglected them, and in some cases it was not until heavy obligations were imposed upon them by forces either within or without the school that they made the necessary effort to properly discharge their duty.

The fifth thesis is that after these subjects became a part of the curriculum the teaching force ignored or forgot the reasons that brought about their introduction and contended for their retention on the ground of their mind training value. "The traditions of the school were such that it seemed necessary to look for some occult educational value in order to give sanction to their presence in the schoolroom." The demand for the subject ceased to be considered in light of its origin, but was emphasized in light of the particular faculty it would train.

The foregoing arguments show that the public schools are, after

all, but the plastic instrument of society, now played upon by one force, now by another. It seems that each of the new subjects was designed to instruct a special stratum of society or to satisfy some immediate and specific need, but under the influences of the schoolmaster their purposes were diverted and changed so that they were made to minister to all classes. Outside the school they were utilitarian; inside the school they were cultural. The educational pendulum has always oscillated between these two extremes. Its permanent resting place has not been found; nor will it ever be found, for new wants will continue to arise as society increases in complexity.

It must not be understood that Dr. Jessup utters severe and unwarranted criticisms against the teaching force. Their conservatism has been the check needed for radical outside agencies. Otherwise the schools would have been made the dumping-ground for every pet idea, Utopian scheme or fad that held the passing fancy of any group. School teachers have always attempted to evaluate materials in terms of function rather than in terms of value. A mere common-sense view of the problem shows that both of these points of view are necessary.

School of Education, University of Illinois. LOTUS D. COFFMAN.

FRANK MITCHELL LEAVITT. *Examples of Industrial Education.* Boston: Ginn & Co., 1912. Pp. viii, 330. $1.25.

There is a widespread conviction that the schools ought to offer a more direct preparation for the industrial needs of the community, but just what this preparation shall be is still a matter of much uncertainty. The present volume will furnish valuable aid in clearing up the inchoate ideas of educators and in placing at their disposal a detailed account of what has been attempted in various localities.

The manual-training movement was the first step on the road to industrial education, but partly through the effort to overcome the opposition to the introduction of hand work in the schools, and partly as the result of prevailing ideas of the teachers of manual training, the cultural value of the work was the one that received the most emphasis, and its industrial significance was almost completely suppressed. The history of the past twenty-five years of manual training is briefly but admirably set forth, and the reasons for the reaction against this cultural employment of the hands are clearly indicated.

The demands for a more specific industrial training are reviewed

in chapters three to six. Four different types of demand are considered: 1. The manufacturer, confronted by an abundance of raw materials, deplores the lack of skilled labor, bemoans the inefficiency of his employes, avers that the unions deliberately seek to prevent efficient skilled production, and calls upon the State to provide such training for the youth as to render them industrially capable. 2. Organized labor, suspicious of the efforts of capital to increase the supply of skilled labor, fearful lest manufacturers should secure control of industrial schools and use them to the disadvantage of the union principle, demands that such schools be established by the State so that the workman as citizen may have an equal voice in their administration. 3. Educators, realizing that the present school system fails to minister adequately to the needs of many pupils, and that a large number of boys and girls drop out of school to go to work in lines that offer no future, call for a training that is more closely adjusted to the requirements of modern life. 4. Social workers, brought face to face with the evils of idleness and want, demand that every boy and girl be given such a training as will afford a reasonable prospect of self-support and increasingly remunerative effort.

Chapters seven and eight discuss the revision of educational ideals involved in these demands, and present a plan for immediate reorganization of the school curriculum, while chapters nine to sixteen give an account of the schemes for industrial education already in operation. These include the Cambridge experiment, the St. Louis, Portland, Cleveland, Berkeley, Concord, and Gary systems as examples of complete reorganization; the Agassiz School in Boston, and the courses in Fitchburg, Los Angeles, Seattle and other cities as types of prevocational elementary school work; the Albert G. Lane Technical High School of Chicago as a secondary industrial school; the Milwaukee and Worcester trade schools as substitutes for high schools; the Fitchburg and the Beverly part time co-operative schools; the Cincinnati, Cleveland, and Boston continuation schools, and the various schemes for vocational guidance that are being tried in different parts of the country. A chapter on State legislation and another on the agricultural situation complete the volume.

It will be seen that the book constitutes an excellent compendium of the attempts to solve the industrial school problem in this country. The volume is distinguished by its scholarly treatment, its freedom from bias, and the simplicity and directness of its style. It will be of great value to all who are interested in industrial education.

J. C. B.

# THE
# JOURNAL OF EDUCATIONAL PSYCHOLOGY

INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

Edited by

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## EDITORIALS.

**EDUCATIONAL PROPHECY.**

From the earliest times the man who was thought to be able to foretell future events has been looked upon with great respect by his fellows. Formerly this gift was supposed to depend upon the seer's insight into the hidden meanings and purposes of things. Nowadays it is the scientist who has fallen heir to the mantle of prophecy, and popular magazines and books are full of references to "the wonders of Science." And, indeed, it is the scientist who is the true prophet, for he studies facts to find out the relations that are generally valid, and, when he has discovered these relations, he can foretell from a given set of conditions precisely the results that may be expected. His is the genuine insight into the purposes of things. This fact is pretty generally recognized in the physical field, and the scientist is there shown the respect which is his due. But the educational scientist has scarcely dared to indulge in prophecy as yet, so fragmentary is his ascertained knowledge of pedagogical relations and so tentative are his generalizations. It is interesting and encouraging, therefore, to see Professor Thorndike, in his vice-presidential

address at Cleveland, launch boldly forth into prophecy, and claim for the scientific educationist the ability to predict with a high degree of accuracy the outcome of certain pedagogical situations. And this is the thing to which studies in education must ultimately lead. "Will James do well in geometry, will he master Latin, will he become proficient in arithmetic, will he make a good speller?" When we shall have developed adequate scales to measure these abilities, and shall have applied the scales to a sufficient number of pupils under the most varied conditions of instruction, we shall be able to say with a definite percentage of reliability just what prospects James has. Then to the educational scientist will accrue the honor, the distinction, the prestige which have always been the meed of the prophet.

**RESEARCH IN SECONDARY EDUCATION.**

It is not a little surprising that, with our best trained and most fully equipped teachers going into secondary school work and with the great amount of thought and discussion that is expended on high-school questions, there should be such a dearth of genuine scientific investigation of secondary teaching. We have language conferences and mathematics round tables, and we appoint committees of ten and fifteen to tell us how physics or history should be taught, but of actual scientific study of high-school teaching and quantitative measurement of results there is scarcely a trace. We only succeed in compounding traditions and opinions, and are no nearer the prophet's insight than before. In elementary education there are several vigorous and promising attempts being made to accurately measure the results of teaching. Is scientific measurement more difficult in the higher subjects, or is it true that high-school principals and teachers are more completely dominated by tradition and are less keen to evaluate their teaching in objective terms? Surely there is no more important field for an accurate study of the teaching process than that portion of the public school system in which the mortality rate is highest. We need more tests of secondary teaching, and we need to apply such tests more widely and frequently, for it is in the "testing of tests" that we get our best and clearest insight into the actual conditions of mental growth.

J. C. B.

# NOTES AND NEWS.

**The report of the National Committee of Fifteen on Geometry Syllabus, which has been under consideration for nearly three years, and which was revised and finally accepted by the N. E. A. in July, 1912, has now been republished in a pamphlet of 80 pages and is ready for distribution to teachers of geometry and all others interested. This report was prepared under the joint auspices of the American Federation of Teachers of the Mathematical and Natural Sciences and the National Education Association. It includes a historical introduction and sections on axioms and definitions, on exercises and problems, and the syllabus itself including both plane and solid geometry. It is hoped by the committee that this report may be of great service to all teachers of geometry, and to this end that it may have a wide distribution among all interested. Copies may be secured gratis upon application to the Commissioner of Education, Department of the Interior, Washington, D. C.**

**Recognizing the fact that the permanent success of the present movement for industrial and other vocational education depends to a large degree upon the skill and ability of the teachers who have charge of the work, and appreciating the scarcity of well-trained teachers in this field and the difficulty of securing a competent instructing staff, the National Society for the Promotion of Industrial Education has established a registration bureau for teachers of industrial, trade, and household arts. The office will not undertake to recommend individuals for positions, but will constitute a clearing-house for information whereby school officials and members of the society may be brought into touch with each other. For the present members will not be informed of vacancies, but all the information collected by the bureau will be placed at the disposal of school officials, and these may then approach those members in whom they are interested. Requests for information should be directed to C. A. Prosser, Secretary, Room 415, 105 East 22d street, New York City.**

Prof. John Adams, in his presidential address before Section L, Educational Science, at the last meeting of the British Association for the Advancement of Science, laid emphasis on the need and the possibility of objective standards in education. We have a great mass of material available for scientific treatment, but as yet it lacks organization. We need more careful, quantitative studies of the facts and the deduction of principles from the facts. The subjective element, the determination of educational policies on the basis of mere unsupported opinion, must give way to objective tests and carefully controlled measurements under experimental conditions. "The hope of the evolution of education lies in experiment."

Students of educational psychology will be interested in Prof. E. L. Thorndike's vice-presidential address before Section L—Education—of the American Association for the Advancement of Science at its recent meeting in Cleveland. The address is printed in full in *Science* for January 24, 1913. Professor Thorndike took as his subject "Educational Diagnosis," and his discussion outlined the development of mental tests and indicated some possibilities of their application in the future. The earlier basis for mental tests—the assumption that by some simple exercise one could determine the excellence of a person's memory, attention, imagination, or what not—has been proven inadequate largely by the use of the tests themselves. In the process of testing the tests the exact relations between abilities began to be revealed, correlations were worked out, and those tests which were significant for the determination of a particular kind of behavior were isolated from those which showed little or no significance. Illustrations of this testing of tests were drawn from recent investigations, and in conclusion the speaker indicated some types of prophecy that are justified by the correlations already established and the exact degree of probability that the prophecies would come true.

The Upper Peninsula (Michigan) Educational Association inaugurated a new movement at its meeting early in October. This was the provision for a bureau of research, for the establishment of which $200 was appropriated. During the coming year the bureau will make an educational survey of the Upper Peninsula of Michigan. The possibilities which this will afford are obvious. The movement

is a good one and worthy to be widely imitated.—*Western Journal of Education.*

Prof. W. H. Heck of the University of Virginia has for several years been making a special study of, and propaganda for, the health basis of education. During the year 1911-12 he was granted leave of absence to investigate school hygiene in New York City, and on his return to the University he inaugurated a systematic campaign representing the University and the State Departments of Health and of Public Instruction. He is now spending four or five days a week in the field, addressing teachers' institutes, mothers' conferences and groups of school children. Among the matters urged are the substitution for the old-time water bucket with the common dipper of either the sanitary drinking fountain or the water cooler with individual drinking cups, janitor service, care of desks and blackboards, the number and use of the recess periods, etc. In Orange County, a fairly typical Virginia county, preparations are being made for a comprehensive survey of the educational hygiene of all the thirty-six schools for white children.

In a recent number of *Science*, J. Madison Taylor, Philadelphia, Pa., makes a plea for the personal registration of family memoranda. Three groups of data are especially to be desired: 1. Antecedent personal history making for knowledge of ancestry and inheritance, including salient characteristics of individuals and the family. 2. Earliest phenomena of growth and development constituting "infant records," which should be carefully registered at the time of observation. 3. Personal history of each member of the family from birth to present age and from all reputable sources; not only of the phenomena of infantile and later development and changes, but also accurate data on physical and other disorders, illnesses, accidents, repairs, corrections, etc. A family record book which would meet popular requirements and also contain the above data is very much to be desired. Mr. Taylor's attempt to arouse interest in this matter deserves commendation and support. It is to be hoped that the day is not far distant when such records will play an important part in determining the attitude of teachers toward individual pupils.

Prof. R. B. von Kleinsmid of the Department of Education and Psychology, DePauw University, has been called to establish a Psychological Laboratory at the State Reformatory, Jeffersonville, Ind. This institution includes those adult criminals which the State deems amenable to reform; the strictly incorrigible adult is sent to the State Prison at Michigan City, Ind. The nature of the problem is, in general, to ascertain what psychology and scientific study can do for these adult unfortunates, and then to apply the results to making them useful citizens. The inauguration of the laboratory was under favorable auspices, the Governor of the State and other officials being present and giving tacit sanction to the work. Professor Kleinsmid is a graduate of Northwestern University, and for several years has been the Professor of Psychology at DePauw University. For some time he has been giving much attention to Abnormal Psychology and its relation to Education. More recently he made a tour of the country studying, at first hand, the work of such men as Dr. Goddard. So far, this seems to be the first attempt to apply the principles of psychology, in this manner, to adult criminals in a State reformatory institution. Since beginning his active work Professor Kleinsmid has made individual studies and measurements of several hundred inmates. As yet it is too recent to give predictions or estimates of results of this interesting work.

The vacancy made at DePauw University by the leaving of Prof. R. B. von Kleinsmid has been filled by Arthur R. Mead, formerly Acting Assistant Professor of Education, University of Minnesota, who becomes Acting Professor of Education and Psychology at DePauw.

Prof. H. E. Jordan of the University of Virginia has been appointed lecturer on eugenics on the new lectureship recently established at that institution by Mrs. Huntington Wilson of Washington, D. C. Professor Jordan's topic was "Eugenics—Its Data, Scope, and Promise."

Prof. Henry Suzzallo of Teachers College, Columbia University, was the chief speaker before the California State Teachers' Association during the holidays. He delivered a series of lectures on sociological aspects of public education.

At the meeting of the American Psychological Association in Cleveland December 31-January 1 Prof. H. C. Warren of Princeton University was elected president for the ensuing year.

Dr. P. P. Claxton, United States Commissioner of Education, was elected vice-president of Section L—Education—of the American Association for the Advancement of Science, at Cleveland, and Mr. S. A. Courtis of Detroit, Mich., was chosen secretary.

Prof. George Trumbull Ladd, Vice-President of Section H—Anthropology and Psychology—of the American Association for the Advancement of Science, chose as the subject of his presidential address at Cleveland "The Study of Man."

The subject of Prof. Edward L. Thorndike's address as President of the American Psychological Association at Cleveland was "Ideomotor Action."

Mr. S. A. Courtis, head of the department of science and mathematics in the District Home and Day School, and author of the Courtis Standard Tests in Arithmetic, recently addressed the Harvard chapter of Phi Delta Kappa, an honor society in Education, on the subject of testing public school children. Mr. Courtis, as a member of the Hanus School Inquiry Commission, made extensive tests of the arithmetical abilities of school children in New York City, and has recently conducted similar tests on several thousand school children in Boston.

Prof. Walter B. Pillsbury, head of the department of psychology, University of Michigan, sailed for Italy shortly before the holiday recess. Professor Pillsbury had planned to go abroad about February 1, but ill-health hastened his departure.

W. S. Hunter, Ph.D. (Chicago), has been appointed instructor in psychology in the University of Texas.

F. A. C. Perrin, Ph.D. (Chicago), has been called to the University of Pittsburgh as instructor in psychology.

## CURRENT PERIODICALS.

*(In this section only such articles will be noticed as bear directly or indirectly upon the interests of this Journal.)*

BRITISH JOURNAL OF PSYCHOLOGY. Vol. V, Part 3, November, 1912. HENRY RUTGERS MARSHALL. *The Relation of Instinct and Intelligence.* 247-266. The author claims that complex adaptive intelligent responses are statable in terms of instinct action. Both instinct feelings and intelligence experiences are the resultants of innate tendencies which must ultimately be referred to inherited structure developing under environmental conditions.

A. M. HOCART. *The Psychological Interpretation of Language.* 267-279. A study in the development of meanings, illustrated by examples from the languages of primitive peoples.

EDUCATION. Vol. XXXIII, No. 4, December, 1912. LOUIS W. RAPEER. *Outlines of Educational Hygiene, Emphasizing Medical Supervision.* 200-207. Medical inspection should be under the control of the Board of Education, and should be placed on an educational basis. Much attention should be given to the division of functions and duties between the school physician and the school nurse.

LAURA H. WILD. *Training for Social Efficiency—The Relation of Health to Efficiency.* 208-222. An interesting account of recent movements to secure more healthful conditions for pupils.

FRANK WEBSTER SMITH. *The Normal School Ideal.* 223-227. Discusses the practical, in contrast to the professional, objects of study in normal school work. Among these are health of pupils, stimulus of surroundings, conditions of school localities, personality of the teacher, common school studies, and the function of the practice school.

THE PEDAGOGICAL SEMINARY. Vol. XIX, No. 4, December, 1912.

ISSAC EMERY ASH. *The Correlates and Conditions of Mental Inertia.* 425-437. An objective measure of independence and originality of thought was sought by giving pupils five pairs of tests, each pair involving an alternative of original observation and study, or the performance of a set task. The results showed that initiative and independence in one situation are apt to manifest themselves in other situations also. Such "persistence of type" is more pronounced in boys than in girls.

ROXANA E. ANDERSON. *A Preliminary Study of the Reading Tastes of High-School Pupils.* 438-460. A questionnaire embracing fourteen topics was sent out and replies were secured from 588 Iowa high-school pupils. On the basis of the results the author discusses the high-school course of study in English, and suggests modifications of required readings.

KATHERINE E. DOLBEAR. *Precocious Children.* 461-491. A summary of recent studies of precocious children, and a consideration of historical geniuses. No first-hand observations are reported. There is a bibliography of sixty-three numbers.

CLARENCE LEONARD STAPLES. *A Critique of High-School Latin.* 492-509. Urges the importance of good textbooks, and recommends emphasis upon those aspects of Latin which are most prominent in the English language. Suggests a course in Applied Latin.

EDWARD HARLAN WEBSTER. *Verse-Making in Our Schools.* 510-517. Verse-making is natural for the child, stimulates to self-expression, contributes to fluency in English, and makes for a better appreciation of poetry.

EARL BARNES. *The Education of a Partially Paralyzed Muscle.* 518-521. Infantile paralysis destroys many of the nerve cells in the cord, but muscular functions can be largely restored by educating other groups of neurones.

THOMAS A. STOREY. *A Follow-up System of Medical Inspection.* 522-525. The results of a plan by which college students are induced to carry out the recommendations of the department of hygiene.

WM. H. BURNHAM AND M. EVELYN FITZSIMMONS. *The Educational Museum at Clark University.* 526-552. A valuable catalogue of the exhibits of this museum.

REVUE PSYCHOLOGIQUE. Vol. V, Nos. 2 and 3, June and September, 1912. AD. FERRIÈRE. *A Dynamic Theory of Heredity and the Problem of the Transmission of Acquired Characters.* 117-151. The author assumes a "cellular consciousness" which controls the relations of the cells within the organism. He thinks that the transmission of acquired characters is probable, in so far as these affect the cellular consciousness, and that the mechanism of the transmission is a sort of "vital induction," analogous to electrical induction in the world of inanimate objects.

VARIA KIPIANI. *Ambidexterity, an Experimental and Critical Study.* 151-248. A very elaborate and detailed study of the subject. A discussion of the theories and scientific basis of asymmetry is followed by a consideration of the pedagogical and pathological points of view, and the article concludes with an experimental study of ambidextral writing and drawing. There is a bibliography of seven pages.

I. IOTEYKO. *The Psychological Basis of Ambidexterity.* 249-253. Argues vigorously against the attempt to train left-handed children

to write, sew, etc., only with the right hand. Thinks that we go to dangerous extremes in the development of righthandedness.

N. BRAUNSHAUSEN. *The Fifth Congress of Experimental Psychology at Berlin.* 255-264. Believes that German experimental psychology stands at a parting of the ways, and that there is a strong tendency to turn away from the study of sensations, ideas, emotions and volitions as objects of pure science, and to bring the detailed and highly elaborated technique of the laboratories to bear upon the problems of applied psychology.

MARIE L. DELHAYE-LAWAESE AND L. GOYENS. *Report of the First Congress of French-speaking School Physicians.* 265-272. Gives a good idea of current problems in the medical inspection of French schools.

SCHOOL REVIEW. Vol. XX, No. 10, December, 1912. EDWARD O. SISSON. *College Students' Comments on Their Own High-School Training.* 649-664. It is admitted that the improvement of teaching lies in a more careful study of the pupils taught. From this point of view the critical evaluation by mature college students of the experiences of their high-school careers constitutes an important source of pedagogical psychology, and this article deserves the careful study of both psychologists and teachers.

EDWARD V. D. ROBINSON. *The Reorganization of the Grades and the High School.* 665-688. The course of mental development is continuous. It is generally conceded that the break between the elementary and the high school is out of harmony with the development of the child. The present article indicates a number of plans by which greater harmony might be secured.

## PUBLICATIONS RECEIVED TO JANUARY 1, 1913.

*(Notice in this section does not preclude a more extended review.)*

A. A. BRILL. *Psychoanalysis: Its Theories and Practical Application.* Philadelphia: W. B. Saunders Company, 1912. Pp. 337. $3 net.

Those who have read fragmentary accounts of the application of psychoanalysis to various phases of education will welcome this authoritative exposition of its principles and methods. Dr. Brill, who is a former pupil of Professor Freud's, and is now chief of the Neurological Department of the Bronx Hospital, is eminently fitted for the task of interpreting Freud's views to English readers. Whatever may be thought as to Freud's theory of the subconscious and the dominance of suppressed sexual elements in dreams and psychoses, the skill of the psychoanallist in laying bare desires of which the patient himself was unaware is at times almost uncanny. While it may be conceded that the Freud school lays an emphasis upon sex which seems disproportionate, it is undoubtedly true that the educator and the physician should take more careful account of the thought undercurrents which determine so many of our actions. This book will contribute largely to that end.

OTTO BOBERTAG. *Quelques réflexions méthodologiques a propos de "l'echelle métrique de l'intelligence" de Binet et Simon.* Reprinted from L'Année Psychologique 18: 1912. Pp. 271-287.

An examination of some of the criticisms made upon the Binet scale in which the general method of procedure is defended, but the question is raised as to the amount of difference in response that will justify ranking a test as belonging to one age or another.

OTTO BOBERTAG. *Ueber Intelligenzprüfungen (nach der Methode von Binet und Simon).* Reprinted from Zeitschrift für angewandte Psychologie, 6: 1912. Pp. 495-535.

The author reviews the total results presented in his former paper (See this JOURNAL, Vol. III, p. 101) and enters into an elaborate mathematical discussion of the percentages attained by the pupils of each age. The criterium of "passing" adopted by each one who has used the Binet scale is critically examined, and a subsequent test is described which involved the retesting of many of the children examined before. The paper deserves careful study.

W. E. CASTLE, J. M. COULTER, C. B. DAVENPORT, AND OTHERS. *Heredity and Eugenics.* Chicago: The University of Chicago Press, 1912. Pp. vii, 315. $3 net.

This book is intended to present the recent developments of knowledge in reference to evolution, heredity, eugenics, and related subjects. Five of the leading investigators in this field have collaborated in its production, and the result is a work which will appeal to the general public, because it presents the latest conclusions in a popular and extremely interesting manner. Each contributor has borne in mind that he is addressing readers untrained in biology, and all technicalities have been avoided wherever possible. The book represents that high type of popularization of biological science which is so much to be desired, and of which we have had so little since the days of Huxley.

W. W. CHARTERS. *Methods of Teaching.* Revised edition. Chicago: Row, Peterson & Co., 1912. Pp. 444.

A revision of Charter's very successful book, first published in 1909. The style has been greatly improved, and the general treatment lightened and enlightened by the addition of numerous and well selected concrete illustrations. The general organization and the statement of fundamental theory remain much as in the older edition. The "practical" chapters have been expanded and enlarged.

HENRY H. GODDARD. *The Form Board as a Measure of Intellectual Development in Children.* Reprinted from The Training School, 9: June, 1912. Pp. 4.

A description of the form board, an account of the typical behavior of children in the test, and tables of the test time for normals and defectives, arranged according to mental and chronological ages.

HENRY H. GODDARD. *The Height and Weight of Feeble-minded Children in American Institutions.* Reprinted from the Journal of Nervous and Mental Diseases, 39: No. 4, April, 1912. Pp. 217-235.

"The low-grade idiot has not only a disturbed brain function, but his entire organism is disarranged and growth processes upset. In the imbecile the same is true, but to a less extent. In the moron we have practically normal growth during the immature years, but an arrest of growth earlier than in normals."

HENRY H. GODDARD. *The Responsibility of Children in the Juvenile Court.* Reprinted from the Journal of the American Institute of Criminal Law and Criminology, 3: No. 3, September, 1912. Pp. 13.

At least twenty-five per cent. of the children that come before our juvenile courts are feeble-minded. It signifies absolutely nothing to put these children on probation or send them to reformatories. They are unable to take care of themselves, and should, therefore, be cared for by society.

WILLIAM ERNEST HOCKING. *The Meaning of God in Human Experience.* New Haven: Yale University Press, 1912. Pp. xxxiv, 586. $3 net.

This is perhaps the most important book on the religious consciousness that has appeared since William James' *Varieties of Religious Experience.* Every thoughtful person will recognize that whether or no God has created man, every man creates his own God. And some form of God every thinking being has created, whether he calls it Father, or Absolute, or Ideal, or Nature, or Science, or Self. The consideration and classification of these "Gods many and Lords many" as they have appeared in human experience is the aim of this book. The titles of the different parts are: Part I, Religion as seen in its effects; Part II, Religious feeling and religious theory; Part III, The need of God; Part IV, How men know God; Part V, Worship and the mystics; Part VI, The fruits of religion.

*L'Intermediaire des Educateurs.* Vol. I, No. 1, October, 1912. Published by L'Ecole des Sciences de l'Education (Institute J.-J. Rousseau). Geneva, Switzerland: Pierre Bovet, 5 Place de la Taconnerie. Pp. 16. Subscription price for ten numbers, Fr. 3.50.

This little magazine, as its title indicates, proposes to act as the "go between" for those who have questions to ask and those who have answers to offer. Special stress is to be laid upon experimental problems in education.

ROBERT JAMES KELLOGG. *Studies in Linguistic Psychology.* 1: No. 2, June, 1912. Published by the James Millikin University, Decatur, Ill. $1.25 per volume of four numbers, or 40 cents per number.

A casual inspection of this little brochure leads one to believe that the author is well read on both the psychological and the linguistic phases of his understanding and that he is earnestly endeavoring to

develop a genetic conception of language. His earnestness is attested by the profusion of black-letter scattered somewhat promiscuously over his pages, and his endeavor is marked by the coinage of such words as psycation and mentition.

F. KUHLMANN. *A Revision of the Binet-Simon System for Measuring the Intelligence of Children.* Journal of Psycho-Asthenics Monograph Supplements, Vol. I, No. 1. Faribault, Minn.: Published by Minnesota School for Feeble-Minded, 1912.

The author has incorporated many of the changes suggested by Goddard and by Terman and Childs. His own revisions involve (1) the standardization of procedure; (2) the shifting of certain tests to age-groups for which they are better adapted; (3) the elimination of poor tests; (4) the reduction of the number of tests for each age-group to five, and (5) the extension of the tests downward to include the following age-groups: two years, one year, six months, and three months. The tests have been admirably arranged for convenient application.

J. RAMSEY MACDONALD. *Syndicalism: A Critical Examination.* Chicago: Open Court Publishing Co., 1912. Pp. viii, 74.

Syndicalism is a labor movement that differs from trades-unionism and socialism in that it proposes indirect as opposed to direct action. Labor is to be emancipated, not through a general absorption of the industries by the government, nor by the organization of workmen for the purpose of influencing legislation, but rather by the formation of industrial combinations among the workers themselves. They must control the industries. The most prominent advocate of this movement, which seems to be gaining ground in Europe, is a French philosopher-poet (erstwhile engineer), Georges Sorel. The present volume is a brief and fascinatingly written account of this unique labor program.

A. J. WILLIAM MYERS. *The Old Testament in the Sunday-School.* New York: Published by Teachers College, 1912. Pp. viii, 141.

"The primary purpose of this essay is to examine the adaptability of the Old Testament as material for the Sunday-school curriculum according to the principle (1) of education, (2) of biblical criticism, and (3) of the Christian conception of life and of society." Modern educational and religious presuppositions are tersely stated in the first chapter. Problems growing out of the history of Israel's religion and literature are discussed in Chapters II and III, and some results of ignoring these problems (for example, the inadequacies of the International Lessons) form the theme of Chapter IV. The remaining chapters are chiefly devoted to the working out of a graded

curriculum. An excellent bibliography concludes the volume. Unfortunately, an index is lacking—a fault in many of the Teachers College publications, which, although largely monographic in nature, are usually comprehensive enough to warrant indexing.

*Proceedings of the Northern Illinois Teachers' Association.* Aurora meeting, November 1 and 2, 1912. Pp. 23.

Introduction by C. A. McMurray. General topic: Relation of Educational Theory to Practice. Brief articles and statements of theses by W. H. Hatch, W. C. Bagley, H. A. Peterson and John W. Cook.

J. E. Wallace Wallin. *Aspects of Infant and Child Orthogenesis.* Reprinted from the Psychological Clinic 6: November 15, 1912. Pp. 153-173.

The paper contains an interesting program for "follow-up" work in connection with school hygiene and the medical inspection of schools.

J. E. Wallace Wallin. *Eight Months of Psycho-Clinical Research at the New Jersey State Village for Epileptics, with Some Results from the Binet-Simon Testing.* Reprinted from the Zeitschrift "Epilepsia," 3: 1912. Pp. 366-380.

Presents an interesting comparison of the mental age curves of epileptics and feeble-minded. The epileptics show a much lower percentage of idiots and imbeciles, but a much higher percentage of morons.

J. E. Wallace Wallin. *Experimental Studies of Mental Defectives. A Critique of the Binet-Simon Tests and a Contribution to the Psychology of Epilepsy.* Educational Psychology Monographs, No. 7. Baltimore: Warwick & York, Inc., 1912. Pp. vi, 155. $1.25.

This is one of the most important and extended studies of the Binet tests that have appeared in English. The first chapter treats of the Binet Scale as a diagnostic instrument for the classification of mental defectives. Chapter two is entitled "Testing the Binet Tests," and in view of the wide application that is being made of these tests is perhaps one of the most interesting parts of the monograph. In spite of many acknowledged defects, the author believes we should hold to the 1908 form of the scale until it has had a more extensive "try-out." In chapter three there is a valuable discussion of the variation of mental and physical traits in relation to the age classification of the Binet Scale, and the final chapter presents detailed directions for the application of the tests to children.